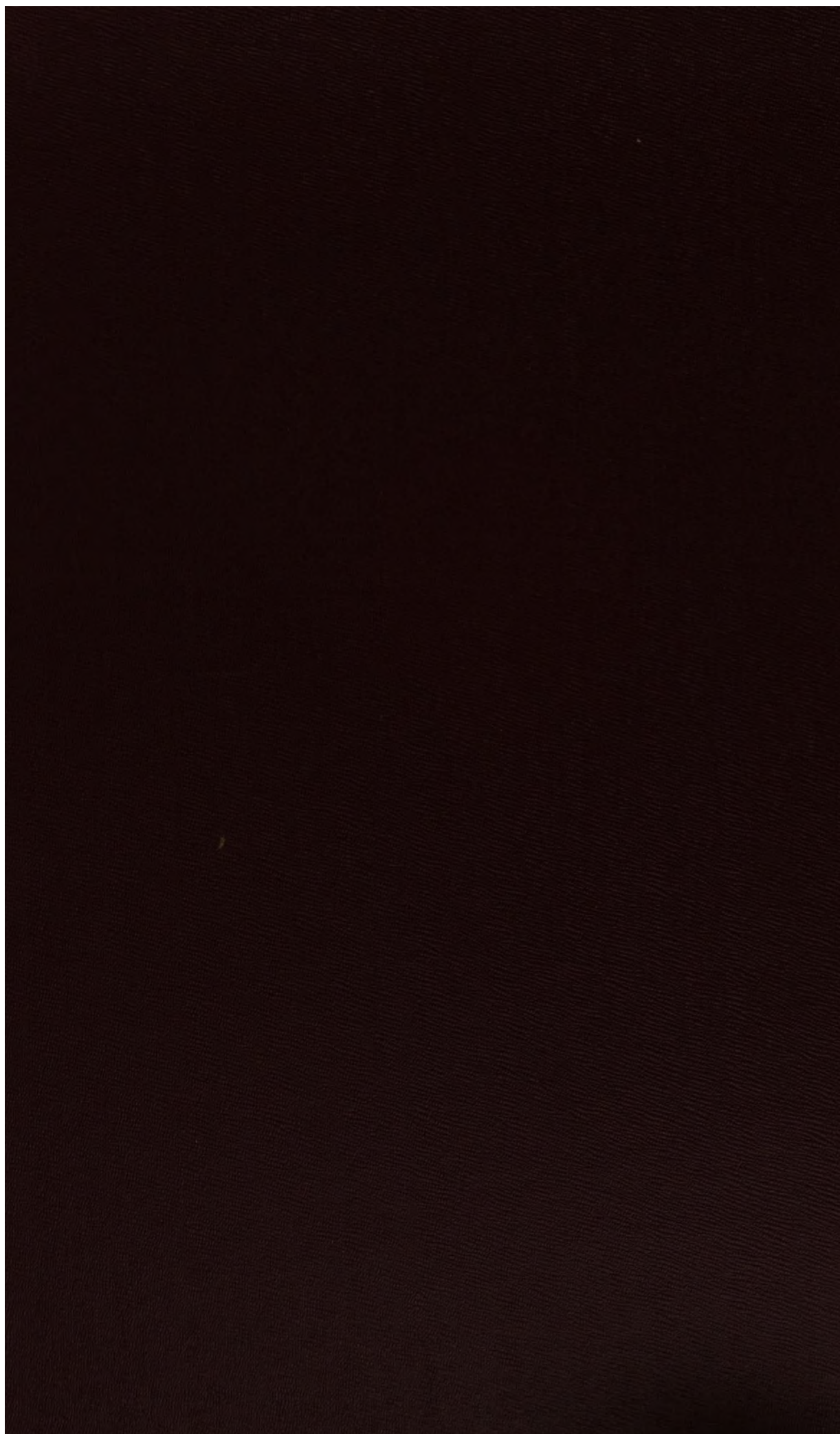






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REPORT

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ON THE

STATION, BARRACKS AND HOSPITALS

OF

BANGALORE.

[Extracted from the Proceedings of the Sanitary Commission.]

1865.

Madras:

GANTZ BROTHERS,

ADELPHI PRESS, 175, MOUNT ROAD,

Mysore X Y. 1



TABLE OF CONTENTS OF REPORT ON BANGALORE.

	<i>Page.</i>
Date of Inspection	1
Method adopted in this Report	1
Regimental accommodation detailed	1
General recommendations regarding whole Station	1
Recommendations of the authorities in England have been complied with	1
Recommendations of the Commission	1
Conservancy of Station has received considerable attention	2
Sewage, Drainage, and Water supply of the Town	2
Position of the Station	4
Salubrity of climate	5
Rainfall... ..	5
Meteorology	6
Climate of 1863	5
Public health in 1863	5
Chemical analysis of Water used for drinking, &c.	5
Public Water Works and method of filtration adopted	6
Filtering strata round well	6
Vegetation of Station	6
Surface drainage... ..	6
Confusion in allotment of Troops	7
Several buildings incomplete	7

MILITARY BUILDINGS ON THE RACE COURSE.

Barrack Blocks	7
A standard of Barrack accommodation must be fixed upon	7
85 square feet, superficial, recommended for adoption in Barracks	7
Sub-division of Barrack rooms	8
These Barracks can be divided into three sets of rooms	8
Detailed statement of accommodation in one Block of the new Dragoon Barracks at Bangalore	9
Allotment of Day, Barrack and Dining rooms for each Troop	10
Number of men to be provided for in each arm of the service	10
Additional Barracks will be required for the Artillery	10
Probable per centage of unmarried men	10
Style of construction to be observed in new Barracks	10
Proposed Hospital	11
An European General Hospital recommended	11
The advantages of such an Institution	11
Views of the Commission regarding Hospital construction	12
Observations regarding Subsidiary Buildings	12
Site for proposed Canteen	12
Proposed slight alteration to the above	12
Improvement in ventilation of the Canteen, suggested... ..	12
Ventilation of Provost Yard	12
Latrine arrangement for Provost Yard not approved	13
Description of Library and Recreation Room	13
Serjeants' Mess	13
Out-buildings, and Cook Rooms of Serjeants' Mess	13
Remarks on Privy attached to Serjeants' Mess	13
Remarks on Privy for Library	13
Urinal required for the above	13
Method to be adopted for the conservancy of Urinals	13
Double Privy with urinals recommended for the Serjeants' Mess and Library	14
Privy for Guard Room and proposed alteration	14

Married quarters for Cavalry and Artillery are small ...	14
Conservancy of Family quarters ...	14
Recommendations regarding Troop Serjeants' quarters ...	14
Removal of foul water from Wash-houses attached to the above ...	15
Condition of Wash-houses on date of inspection ...	15
Erection of Stables for the Cavalry and Artillery ...	15
Latrine accommodation necessary for School Rooms ...	16
Workshops insufficient in number ...	16
Cooking ranges and utensils required for Cook Rooms ...	16
Plunge Bath required for Barracks ...	16
Out-of-door recreation to be provided ...	16
Drainage of Barracks defective ...	17
Open drains recommended... ...	17
Conservancy of the neighbourhood extremely bad ...	17
Adjoining village to be improved ...	17
Recommendations of the Commission ...	18

OLD DRAGOON BARRACKS.

Component parts of Old Dragoon Barracks ...	18
Detailed statement of accommodation in one block of the Old Dragoon Barracks at Bangalore ...	19
Barracks are insufficient for a full Infantry Regiment ...	20
Mode of construction of Barracks ...	20
Fa'lacy in calculating only the cubic space in the allotment of Barracks... ...	20
Capacity of each Barrack... ...	20
Overcrowding witnessed in Barracks on date of inspection ...	21
Deficient light in Barracks ...	21
Saddlery should not be kept or cleaned in Barracks ...	21
Serjeants' Quarters in Barracks defective in the means of washing ...	21
Deficiencies in means of bathing and cooking ...	22
Lavatories and Urinals found offensive ...	22
Remedy proposed for the above ...	22
Proposed improvement in Wash-house ...	22
Wash-houses should be close to Barracks ...	22
Removal of present Family Quarters recommended ...	22
Married Quarters open to objection as regards plan of construction ...	23
Description of Main Guard ...	23
Furniture required for Main Guard ...	23
Privy of Guard Room defective ...	23
Number and dimensions of Solitary Cells ...	23
Military Prison recommended ...	23
Subsidiary buildings generally approved ...	23
Detailed statement of accommodation in the Regimental Serjeants' and Librarian's quarters of the Old Dragoon Barracks at Bangalore ...	24
Present Latrines for non-Commissioned Officers objectionable ...	26
Wash-houses for Women far from the married quarters ...	26
Water supply insufficient ...	26
Rations good ...	26
Dimensions of Canteen ...	27
Clothing well adapted to the climate ...	27
Opinions of the Commission regarding Beds and Bedding ...	27
Hospital condemned ...	27
Dimensions of Hospital out-houses ...	28
Statement of dimensions of the Hospital ...	29
Recommendations of the Commission regarding the old Dragoon Barracks ...	29

ROYAL HORSE ARTILLERY BARRACKS.

Detailed statement of accommodation in one block of the Horse Artillery Barracks at Bangalore ...	30
Style of construction of Barracks ...	31
Superficial space to be allowed ...	31
Capacity of present Barracks ...	31

	<i>Page.</i>
Saddlery and Harness to be removed from Barracks ...	31
Beds open to objection ...	31
Insufficient light at night ...	31
Ventilation and Drainage of Serjeant Major's quarters defective ...	31
Lavatories of Barracks are too small ...	32
Cook rooms deficient in cooking apparatus ...	32
Privies should be re-built on better site ...	32
Proposed site for other out-buildings ...	32
Proposed use of present condemned Hospitals ...	32
Furniture for Reading rooms required ...	32
Drainage of Barrack defective ...	32
Serjeants' quarters much exposed to the sun ...	32

NATIVE HORSE ARTILLERY LINES.

Drainage is being improved ...	32
--------------------------------	----

HOSPITAL FOR ALL ARTILLERY.

Faults in the condemned Hospital ...	33
Detailed statement of accommodation in the Hospitals of the Royal Artillery ...	34
Hospital Serjeant's quarters should be ridge ventilated ...	35
Health of Soldiers ...	35
Native Hospital ...	35
Canteen and Serjeants' Mess well arranged ...	35
Game and Recreation room in Barrack Block... ..	35
How to be eventually provided for ...	35
Horse lines are well situated ...	35
Harness room ...	35
Schools for adult Soldiers, Boys and Girls ...	35
Teachers ...	35
New school and competent Teachers required ...	36
Out-of-door recreation ...	36
Plunge Bath required ...	36
Workshops ...	36

FOOT ARTILLERY BARRACKS.

Detailed statement of accommodation in the Regimental Serjeants' quarters of the Horse Artillery at Bangalore. ...	36
Detailed statement of accommodation in the Regimental Serjeants' quarters of the Foot Artillery at Bangalore. ...	36
Site of Barracks ...	37
Detailed statement of accommodation in the Rooms and Verandahs of A. Battery 23rd Brigade Royal Artillery. ...	38
Barrack rooms recently ridge ventilated ...	39
Adjacent church-yard is objectionable ...	39
Verandahs, front and rear ; the use of one as a saddle room objectionable ...	39
Guard room and Prison room should be ridge ventilated ...	39
Cook-room in bad repair and unsuitable ...	39
New Cook-room required with tables, &c. ...	39
Privies should be adapted to the dry earth system ...	39
Wash-house too small ...	39
Defects in Solitary Cells ...	40
Furniture deficient in Reading Room ...	40
Canteen uncomfortable ...	40
Family Quarters small and ill-ventilated ...	40
Saddle and Harness Rooms, Workshops, &c....	40
Soldiers' Gardens... ..	40
The storage of water in Shoolay Tank should be increased ...	40
Public Latrines close to Shoolay Tank ...	40
Recommendations of the Commission ...	41

MAIN GUARD.

Description of Main Guard ...	41
-------------------------------	----

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BARRACKS OF INFANTRY REGIMENT.

[illegible]

GARRISON HOSPITAL.

Detailed statement of accommodation in the Garrison Hospital of Bangalore	...	...	...	...	...
Style of construction of Hospital	...	...	...	...	...
Capacity of Hospital	...	...	...	...	...
Hospital unfit for continued occupation	...	..	...	...	...
Latrines are ill constructed	...	...	...	...	...
Separate Ward too small	...	...	...	...	...
No Dead Room	...	...	...	...	...
Arrangements for water supply	...	...	...	...	...
Female attendants	...	...	...	...	...
Persons entitled to treatment in Hospital	...	...	...	...	...

LOCK HOSPITAL.

Detailed statement of accommodation in the Lock Hospital of Bangalore			...	...	...	...	44
Cleanliness of Hospital	...	...	...	...	...	...	47
Clothing to be issued to inmates	...	...	...	...	...	...	47
Control of Prostitution	...	...	...	...	...	...	47
Probable number of Prostitutes	...	...	...	...	...	...	47

LINES OF MADRAS SAPPERS AND MINERS.

Site of Lines	47
Proximity of Ulsoor Tank... ..	47
Limits of the Lines	47
Adjacent Native huts objectionable .. .	48
Drainage required for native village	48
Drainage practicable	48
Adjacent buildings prevent ventilation of these Lines... ..	48
Permanent Lines required	48
Lines could be built by the corps	49
Effect on health to be expected from permanent Lines	49
Old Horse Lines to be converted into European and Native gardens .. .	49
Old Sick Lines and Gram boiling shed	49
Staff Serjeant's Quarters afford sufficient recommendations	49
Overcrowding witnessed in Married quarters	49
Proposed Family Quarters good and suitable... ..	49
Superiority of the above over Married quarters elsewhere in Bangalore .. .	50
Out Offices badly placed... ..	50
Suggestions by the Commission	50
Details of Conservancy... ..	50
Means for removing kitchen and house refuse	50
Barrack Block	50

	<i>Page.</i>
Subsidiary Buildings	50
Main Guard, Places of Arms	50
Improvements required to make the Barracks inhabitable	50
Improvements required in proposed School Rooms... ..	50
Site for detached School Room if required	51
Hospital is well situated	51
Requirements of Hospital if segregation is to be insured	51
Distinct accommodation required for Europeans	51
Ventilation of old Hospital	51
Site for new Hospital	51
Private dwelling adjacent should be removed... ..	51
Adjoining private residence should be removed	51
Plunge Bath should be placed in, or close to, the proposed gardens	51
Recommendations of the Commission	52

LINES OF NATIVE INFANTRY REGIMENT.

Description of huts	52
Position and drainage of Lines of 33rd Regiment	52
Conservancy neglected	52
Faults in the huts	52
Sepoys' pay for Conservancy Establishment	53
Conservancy should be provided by Government	53
Public Latrine much neglected	53
Sepoys' Gardens are well cultivated... ..	53
School house small and badly lighted	53
Suitable Regimental Serjeants' Quarters recommended	53
Guard Room sufficient	53
Dimensions and description of Prison Cells	53
Water supply of 33rd Regiment	54
Lines of 14th Regiment sometimes unhealthy	54
Latrine accommodation defective	54
Public conservancy of the neighbourhood	54
Sanitary condition of the Lines	54
Construction and drainage of the Lines	54
Solitary Cells	54
Guard Room	54
Accommodation in School Room	54
Water supply good and plentiful	54
Sepoys' Gardens	55
Lines of the 22nd Regiment defective in ventilation and drainage	55
Guard room and Solitary Cells of 22nd Regiment	55
Water supply satisfactory	55
Sepoys' Gardens	55
Subsidiary Buildings of Native Regiments faulty	55

HOSPITALS OF NATIVE INFANTRY REGIMENTS.

Style of construction of Hospital of Native Infantry	55
Uniform style in the three Hospitals	55
Detailed statement of accommodation in the Hospitals of Regiments of Native Infantry at Bangalore	56
Description of Wards and Rooms	57
Width of Wards... ..	57
Central pillars objectionable	57
How to dispense with them	57
Hospital at variance with Colonel Crommelin's plans	57
Overcrowding in all Native Infantry Hospitals	57
Separate Ward of Hospital of 33rd Regiment near public road	57
Dispensary and Office	57
Cots	57
Requirements of the Hospital	58

	<i>Page.</i>
Privy offensive	58
Want of quarters for Medical Subordinates	58
Hospital of the 22nd Regiment very defective	58
Main Ward obstructed by central pillars	58
No special or separate Wards	58
Description of the Hospital of the 14th Regiment M. N. I.	58
Recommendations of the Commission	58

HEALTH OF THE TROOPS IN GARRISON.

Prevalence of Venereal disease	59
Venereal disease among Europeans...	59
Opinion of Medical authorities on proposed system of control of Prostitutes	59
Imperfections of the present system	59
Sick Report of Regiments of Native Infantry at Bangalore, 31st October 1865	60

CAMPING GROUNDS.

Description of Camp	62
---------------------	----

EUROPEAN SOLDIERS' CLUB.

Proposal to establish a Soldiers' Club	62
General Camping Grounds	62

APPENDICES.

A. Meteorological Tables	i
B. Statement of the results of analysis of certain Drinking Waters from Bangalore	iii
C. Statement shewing details of established strength of each arm of service of the Madras Army	iv
D. Statement shewing the composition of strength of each arm of the service of the Madras Army	iv
E. Letter from President Sanitary Commission to Quarter Master General, Fort Saint George, regarding proposed new Hospital for Bangalore...	v
F. Letter from President Sanitary Commission to Secretary to Government, Public Works Department, Fort Saint George, regarding Hospitals for European and Native Troops	xi
G. Letter from President Sanitary Commission to Secretary to Government, Military Department, Fort Saint George, regarding stables for Cavalry and Artillery horses	xx
H. Letter from President Sanitary Commission to Secretary to Government, Military Department, Fort Saint George, regarding beds and bedding for European Troops in India	xxiii
Proceedings of Government, Military Department, No. 2894, dated 7th August 1865	xxv

REPORT

ON

The Station, Barracks, and Hospitals of Bangalore.

By

ROBERT S. ELLIS, C.B.,

President, Sanitary Commission.

1. The inspection of this important station was commenced on the 7th September 1864, as detailed in the inspection report of the King's Dragoon Guards' Hospital. Subsequently to this, and previous to a complete examination of the Military buildings, I was obliged to proceed on duty to the Neilgherry Hills, and afterwards to Masulipatam, and the completion of the whole Report on the station has been in consequence much delayed.

Date of Inspection.

2. In this report, the Barracks, Hospitals, Family quarters and all Regimental buildings, &c., are first considered in detail—and at the end of the report for each Regiment, *recommendations* are submitted for the consideration and orders of Government.

Method to be adopted in this Report.

Regimental accommodation detailed.

3. In a summary, general observations are drawn up regarding the different items of accommodation (as Barracks, Hospitals, &c.) of the whole station, and rules regarding Barrack and Hospital accommodation, Water supply, Drainage, &c., are proposed for definite sanction by Government.

General recommendations regarding whole Station.

4. In submitting this report, I have been anxious to point out errors in existing buildings and arrangements not only that these defects may be as far as possible remedied, but with a view to general principles on these points being clearly laid down, to assist Medical Committees and Engineers in designing new buildings.

5. I may here state for the information of Government that I have been privately placed in possession of the earliest published copy of the remarks, of the Royal Commissioners for Barrack and Hospital Improvement, on Dr. Leith's report on the Sanitary condition of the Bombay Army, and that I have, as far as possible, framed my observations in accordance with the recommendations of that Commission.

Recommendations of the authorities in England have been complied with.

6. The recommendations of the Commission are as follows :—

- (1.) That each station be carefully examined by competent Sanitary and Engineering officers, and that a careful survey be made, and a well-digested scheme for improving the station be prepared and submitted for sanction. The scheme to include—
- (2.) Levelling, filling-up, paving, and otherwise improving the surface-drainage of the station.
- (3.) Drainage and water supply, including sub-soil drainage, house drainage, filtration, and distribution of water over the station.

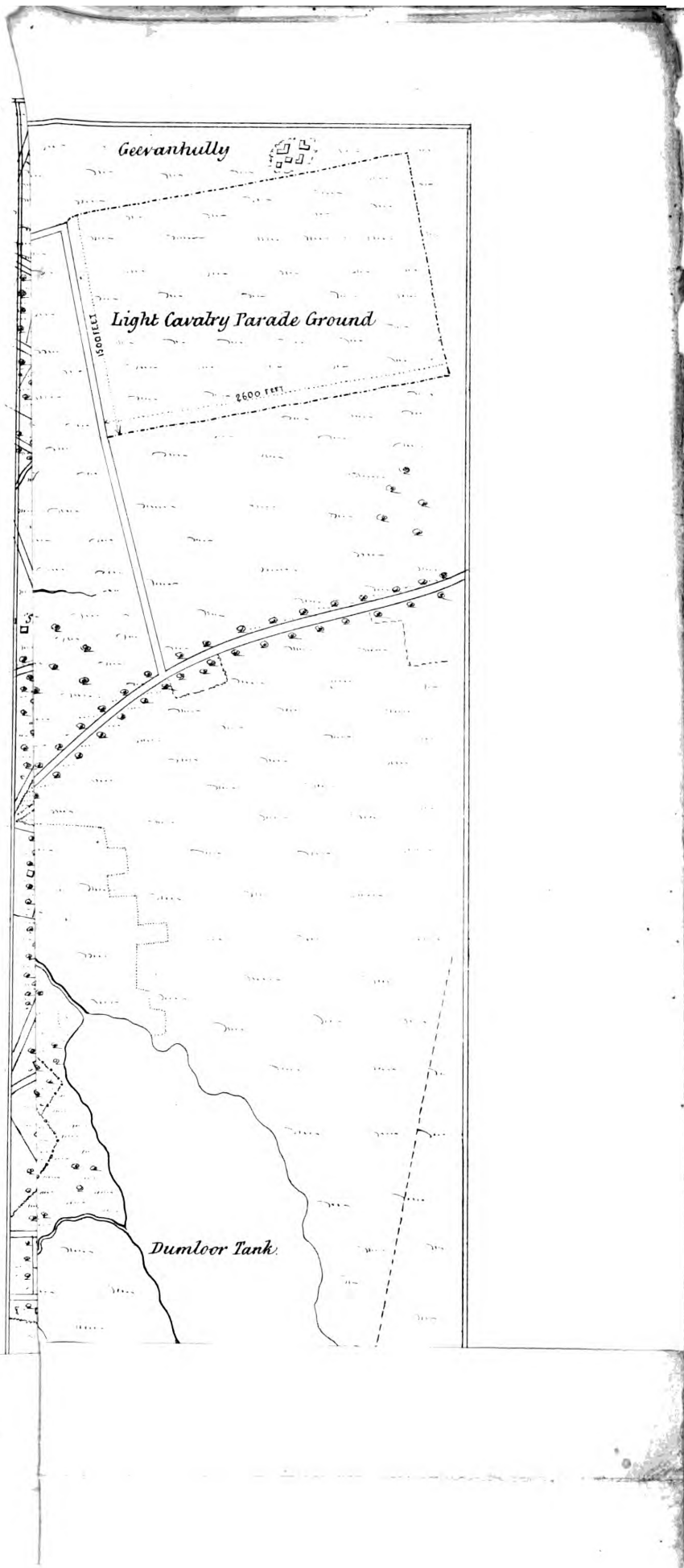
- (4.) Improving existing Barracks and Hospitals, including raised floors, with ventilation beneath, or providing upper floors for sleeping rooms, in localities where it may be necessary to do so.
- (5.) Ventilation of Barrack-rooms and Hospital-wards, on the principles laid down in our "Suggestions." Improvements in lighting Barracks and Hospitals.
- (6.) Fixing, *by regulation*, the superficial and cubic feet to be allotted per bed in Barracks and Hospitals, the amount being regulated according to the healthiness or otherwise of the locality, on the principles laid down by the Royal Commission. In doing this, rooms or wards unfit or doubtful for occupation should be excluded. And the amount of additional Barrack and Hospital accommodation necessary to admit of the regulation being complied with, should be stated.
- (7.) Sub-dividing long Barrack-rooms and Sick Wards, so as to have no more than from 20 to 24 beds per room, and providing that each room is completely cut off from the others, and ventilated separately.
- (8.) Improved latrines, water-closets, and urinals for Barracks and Hospitals.
- (9.) Improved and extended ablution and bath accommodation for Barracks and Hospitals.
- (10.) Improvements in Cook-houses, Hospital kitchens, and cooking apparatus.
- (11.) The provision of sufficient accommodation for exercise, recreation, and instruction in the way of gymnasia, work-shops, reading and day rooms, soldiers' gardens, covered ball Courts, &c.

7. I believe that in few stations in the Presidency, except in Bangalore, has any complete scheme been prepared for "the improvement of the station," contemplated in para. 1 of these recommendations. But it may be not unreasonably expected that this subject will engage the early attention of Cantonment Committees, when these are instituted as proposed in the Military Cantonment Act. I trust that the necessity of accurate surveys of Military and Civil stations may be speedily recognized, as they form the great basis upon which all schemes for conservancy, drainage and water supply and distribution must be planned.

8. I am happy to be able, however, to state that Bangalore is in some respects far in advance of almost all towns in Southern India, and that both the Military and Civil Authorities have vied with one another in attempting to promote the improvement of the town and its proper conservancy. The improved condition of the Bangalore station is due to Mr. Bowring, the Commissioner of Mysore, and Major-General the Hon'ble Augustus A. Spencer, C. B. These Officers have received the most cordial assistance and valuable co-operation from Dr. Mackenzie, C. B., the Deputy Inspector-General of the Division; and Captain Cole, in charge of the Civil portion of the station. I am much indebted to all these gentlemen for the valuable information afforded to this Commission and for the ready willingness with which they accepted all suggestions offered by us.

9. Regarding the surface drainage and conservancy of the station as of extreme importance, I took the opportunity of my visit to examine in detail all that had been done by the Municipality as regards Drainage, Water supply, removal of Sewage, and the general conservancy of the town.

10. The following Extracts from Reports by Dr. Mackenzie, C. B., and Major Sankey, will satisfactorily show what has been done in respect to these matters. I quote them here as bearing upon the question of the general conservancy of the station. The conservancy of the Barracks will receive special notice afterwards.





Extract from the Inspection Report by Deputy Inspector-General W. Mackenzie, C. B., M. D.

"In spite of the representations which have been made on the conservancy of this station, very few towns in India appear to have received the same amount of consideration in regard to Sanitary arrangements, and I cannot but think that the misconceptions, which have obtained publicity on this subject, arise from simple ignorance of facts. In the first place the conservancy of the Cantonment and Bazaars is carried out with a large Establishment at an annual cost to the Mysore Government of Rs. 14,400."

2nd. "The jurisdiction of the Municipal Committee extends over an area, on a rough calculation, of about 14 square miles, which is divided into 5 Districts, each under charge of an European Overseer."

3rd. "Manure pits have been established at a distance from Cantonment, to which the whole of the sweepings of the streets and side drains are removed daily."

4th. "Five new double latrines—that is for both males and females—have been constructed within the past year, bringing up the total of these public conveniences to the number of 12, they are much used and are all daily thoroughly cleansed out and washed."

5th. "About 400 yards of drains have been lately constructed or re-laid in the bazaars, and provision has been made in the Budget, just submitted, for the years 1864-65 for the complete repair, &c., of the whole of the drains throughout the town during the approaching official year."

6th. "New masonry built market places have been erected."

7th. "A large portion of ground leading down the centre street of the principal bazaar has been set apart for gardens for the use of the sepoys, by which the bazaar is well opened out and free perfusion of air throughout the district secured."

8th. "Slaughter houses, on an approved model, exist at the North-west side and quite in the suburbs of the Town."

9th. "A large portion of swampy, marshy ground underneath the Shoolay tank covering an area of 9 acres and 1,087 yards, lying in the close proximity of the Foot Artillery Barracks on the West side, and about $\frac{1}{4}$ of a mile to the North of the new Barracks at the Race Course, has been re-claimed and converted into Soldiers' Gardens, in which several of the men of the Battery and 66th Regiment, find profitable and healthful recreation. Vegetables of every variety, Native and European, are grown in great perfection, and portions are very tastefully laid out in flower plots of much beauty. All this, with the energetic supervision of the Municipal Committee, give good assurance of eventual effective working."

10th. On the subject of the drainage, the present Officiating Chief Engineer of the Mysore Commission has been good enough, at my request, to draw up a short statement, copy of which I beg to append to my inspection Report."

11. The following is Major Sankey's Report alluded to in Dr. Mackenzie's Remarks, and it shows briefly the accomplished and projected improvements in the Drainage of the station.

1st. "From the peculiar conformation of the ground in the neighbourhood of Bangalore, there are three distinct drainage areas, the first and most important being that, which includes the Cantonment Bazaar, the old Light Cavalry Lines, the present Dragoon and Infantry lines, and the village of Ulsoor; the second, the district of Shoolay; and the third the Fort and Pettah of Bangalore."

2nd. "In addition to the obvious advantage of providing in a systematic manner for the drainage of the first named area, it was sufficiently apparent that the scheme, whatever it should be, must in the first place cut off the sewage of the Cantonment Bazaar before reaching the Ulsoor tank, the water of which being used by both the troops and the inhabitants of the bazaar had hitherto been contaminated by its reception."

3rd. "Very great difficulties attended the consideration of the question, as in the first place it was clear that to cut off completely the whole of the storm waters flowing down the

"bazaar channel would simply deprive the tank of half its supply, and in the second place that there was no possible means of securing any addition to the water supply of the station. Years of investigation having in vain been devoted to the subject by such men as Sir A. Cotton, Colonel Green, and other experienced Officers."

4th. "It is needless to show in detail, how these difficulties were got over, or rather promised. Suffice it to say, that a large oviform sewer has been constructed for upwards of $\frac{3}{4}$ of a mile in length, and passing under the bed of the Ulsoor tank, delivers the sewage into an open masonry channel, which again is succeeded by another one delivering the filth eventually into a tank $3\frac{1}{2}$ miles away from the Cantonment."

5th. "Though the flushing arrangements are of necessity imperfect, they are the very best, I believe, which could be devised, and as the flow of the sewage is assisted by the great slope of the ground, the slightest fall of rain effectually sweeps the sewer and open drain perfectly clean. So clear indeed is the channel at all times, that hardly any trace of offensive smell can be detected even on the edge of the open channel, and none whatever a few yards off."

6th. "It is true the upper drains of the bazaar itself and some other ducts connected with the Barracks, are not affected directly by these large drainage works, and from the impossibility of procuring a supply of water for flushing, it will probably be always difficult to put them on a thoroughly satisfactory footing, yet as the first consist of stone, with a good slope, and are being improved, and as the second are proposed to be dealt with by the introduction of the Dry System, I have every reason to think that before long, the whole arrangements will be as complete, as is possible, under the circumstances."

7th. "With reference to the drainage of the *second* area, viz., the district of Shoolay as estimate is entered in the Budget of 1864-65 for introducing such improvements as at present appear to be required. Here again the same difficulties occur with reference to water supply, and hence the arrangements must, of necessity, consist of a species of compromise, but like the others above described, they will be as effective as possible. Large sums have already been expended in improving this quarter of Bangalore, in other respects directly affecting its Sanitation."

8th. "Regarding the drainage of the Fort and Pettah, a very complete scheme of drainage, and very costly, I may add—has already been submitted for the consideration of the Government of India, and will probably be ere long sanctioned for execution."

12. The several places alluded to in Major Sankey's Report are shown in the accompanying map from which also may be gathered the relative position of many of the public buildings both Civil and Military.

13. It is desirable before entering into the details of inspection briefly to notice certain subjects which directly affect the health of all classes, such as the climate and the Water supply of Bangalore.

14. I do not deem it necessary here to allude to the topography of the place as ample information on this subject is in the possession of Government. But I may allude to the great importance of Bangalore as a Station, owing to the large Military force constantly stationed there (1,800 to 2,000 men) and as the Head Quarters of the Mysore Commission, and a most popular Sanitarium for the greater part of Southern India.

15. From its position and elevation, Bangalore is exposed to the beneficial influence of both the N. E. and S. W. Monsoons. It is situated in
 Position of the Station. Latitude $12^{\circ}57'$ North, Longitude $77^{\circ}38'$ East, and is 3,000 feet above the level of the Sea. The distance from Madras is about 200 miles, though both Road and Rail are somewhat longer, but the direct connection with the seat of Government and the possibility of accomplishing the journey in twelve hours render Bangalore deservedly popular, not only with invalids, but with all persons able to leave the oppressive climate of the Presidency Town for the bracing air of the Mysore Plateau. The surface of the Mysore country is studded with Hills of various sizes, and in these many of the Rivers irrigating the low country take their origin. Some of those Hills rise to an altitude of 4,000 to 4,500 feet, and might possibly afford sites for Sanitaria were such required.

16. Although generally temperate and pleasant, and with a climate somewhat resembling that of England, there are portions of the Mysore country which are undoubtedly feverish, and the Yelwall Range (as noted in my Report on the Mysore Native Lines,) possesses an unenviable pre-eminence in this respect.

17. The Eastern and Western Hill Ranges distant 60 to 80 miles, tend to break the force of the Monsoons, and although heavy showers are frequent, rain is rarely of long continuance and by no means equal either in duration or intensity, to the monsoon rains of the adjoining low lying country of the Eastern or Western Coasts.

18. The rainfall at Bangalore is so fairly distributed over the months from March to October inclusive, that even at the height of the hot weather season (May to July) the Cantonment continues to preserve its verdure little impaired. The air is usually cool at night and sometimes in the morning is exceedingly cold, the thermometer being registered at 69° as an average in the month of December, and occasionally as low as 52° in the morning. Gneiss Granite and Hornblende Gneiss are abundant.

Water is naturally plentiful both in tanks and wells, but the well water is often brackish.

19. The Meteorological tables in Appendix A. will sufficiently indicate the leading features of the climate and their probable influence upon public health.

20. The climate of the year 1863 was seasonable and calculated to conduce to the public health. The rainfall was somewhat in excess of that shown in 1859, and amounted to 32 inches and it fell during 91 days.

Dr. Mackenzie thus reports :—"The highest reading of the Barometer was 26.75 in January, November, and December, and the lowest 26.45 in June, July, September, and October. The highest reading of the Thermometer in the Sun was 117° in April, the lowest 52°. The mean temperature was 79°. The mean deduced dew point was 67°, and the mean degree of humidity 82°."

21. During the prevalence of the S. W. Monsoon (May to September) the wind was from that quarter. Similarly during the N. W. Monsoon the wind was from that direction becoming E. in January and February and then variable until May.

22. In this cool and agreeable climate the health of the Troops was good and they "enjoyed a remarkable immunity from serious disease."

23. Individual cases of unhealthiness arose in connection with particular causes, but these were fortunately of a remediable character and of trivial importance, and in one of the Regiments the death-rate was as low as 14 per thousand and effect of climate was equally evidenced by the eventual improvement in health of the 66th Regiment who had previously become much debilitated by prolonged residence in the enervating climate of the Western Coast.

24. Perhaps one of the best tests of the salubrity of this climate is the appearance of children of all ages who present the same ruddy appearance that characterises them in England; and the men of the European Regiments much more resemble their comrades at home than the pale and debilitated Soldiers stationed in the plains of India.

25. The water supply of Bangalore is chiefly dependent upon wells in public and private compounds and upon the Ulsoor and Shoolay tanks.

An analysis of these waters has been made, and it shows results which are on the whole satisfactory. Any of the waters reported on would, if boiled previous to use, be freed from much of the suspended matter to which their opacity is to be referred.

red, and ordinary filtration if carefully conducted would remove the suspended impurities. The low degree of temporary and permanent hardness is satisfactory and may be accepted as a proof of the suitability of the water for cooking and drinking.

26. It is believed that much of the alleged impurity of the water of the Ulsoor tank was formerly due to its receiving both surface and sewage drainage from the adjacent Barracks and Horse Lines of the King's Dragoon Guards, but the measures adopted for the drainage of these places by Major Sankey seem to have been eminently successful in removing this great source of impurity, and the water is now of good quality.

27. During the progress of my inspection of this station I visited the reservoirs in the course of erection on the Ulsoor Rock situated in the middle of the tank of the same name. Large Chambers of solid masonry are here built into which water will be lifted from the Tank by steam power, and thence passed through filtering beds into large iron pipes by which it will be conveyed to the new Barracks in course of erection on the Race Course.

28. This method of filtration is much to be recommended, but it does not, in the opinion of this Commission, obviate the necessity of providing suitable filters in all Barracks and Hospitals. An analysis of various waters at Bangalore has been submitted by Dr. Wyndowe, the Chemical Examiner to Government, and if filtration of the water when raised from the Ulsoor tank is efficiently performed, and if this process is repeated immediately before its use, the water of this tank will be fit for human consumption.

This Analysis is printed *in extenso* as Appendix B. of this Report.

29. At one part of the Bazaar much inhabited and largely resorted to by cattle, the water of one well became so offensive that it ceased to be drinkable. A very ingenious method of obviating the entrance of impurities clearly due to surface drainage was adopted. The well was dug round to a considerable depth, and a deposit of sand and charcoal was laid down so as to cut off the immediate contact of the earth from the walls of the well. Any percolation which now occurs passes through a purifying medium, and the result of this has been very remarkable. The well has once more become sweet and is freely and by choice resorted to by natives who, above all other people, are exceedingly fastidious in regard to the water they use, and who possess great powers of discrimination in detecting impurities and ill flavor in water.

30. Although a good deal of ornamental planting in private grounds and in road avenues has been carried out, yet there is little or no jungle; and large trees are exceptional outside the Station. English flowers and vegetables are produced here in great perfection, as will be seen in subsequent portions of this Report; the Soldiers both European and Native have been induced to cultivate land in this way with manifest advantage to their own health and the salubrity of the neighbourhood adjoining their Barracks and Lines.

31. The vicinity of the station may now be said to be free from swamps or low jungle likely to generate miasmata, but a portion of the Ulsoor tank was formerly, and some of the Shoolay tank is still, somewhat offensive in the months of February and March, owing to the exposure of decaying vegetable matter resulting from the low and shallow water becoming evaporated, and from the absence of rain.

32. Surface drainage must continue to run into these sheets of water, but it may be perhaps found that by restricting their area and deepening the water bed not only can the annual storage of water be increased, but also its loss by evaporation be diminished. This has been done to a certain extent in one part of the Ulsoor tank where a good space of ground has been reclaimed and converted into a nursery of trees for the Department of Public Works.

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33. I have entered thus fully into the question of water supply and climate as in both respects Bangalore is exceptional to almost all Military stations in Southern India. And, as regards climate, a full consideration of its peculiarities induces this Commission to sanction some variation from the standard of accommodation (for other than Hill stations in India) in Barracks and Hospitals.

34. I now proceed to notice in detail the various buildings occupied by the several Corps at Bangalore. Before doing so, however, I may explain that owing to the non-completion of the new Barracks on the Race Course, and in consequence of other circumstances there was at the time of my visit a good deal of confusion as regards the occupation of different public buildings. Thus some of the 66th Regiment of Europeans were located in the Dragoon Barracks. The Artillery were under treatment in an hospital that has been condemned; some of the Foot Artillery were on the Race Course and some in their own Barracks.

35. The Barracks of the 66th have been condemned and are therefore less minutely described than they would otherwise have been. The new family quarters for the Cavalry and Artillery on the Race Course are not completed; and several of the more important buildings here are unfinished and some of them can only be remarked upon from the designs submitted to this Commission by His Excellency the Commander-in-Chief.

36. It may therefore be well to consider the different groups of buildings as nominally occupied and to indicate any future changes either already sanctioned or now proposed by this Commission. The accompanying plan of the Cantonment shows the relative position of all localities and buildings alluded to in this Report. (Map A.)

MILITARY BUILDINGS ON THE RACE COURSE.

37. On a high lying piece of ground situated to the South of the Ulsoor Tank a number of Military buildings are now being erected which will when completed form one of the finest Barracks in India.

The buildings are one-storied but with good basements, the floors being $2\frac{1}{2}$ feet above the ground.

38. The accompanying Plan B. will explain the relative positions of all the buildings either completed, in process of erection, or merely designed. The Barrack Rooms are eight in number and occupy two sides of a square, being, however, well separated and having a free current of air in all directions. These Barracks are intended for occupation by the European Cavalry Regiment, and a portion of the Artillery—and it was proposed to erect an hospital in the several wings of which the men of these two arms of the service were to be accommodated. It therefore becomes necessary to fix authoritatively what number of men can be placed in the Barracks and how far the proposed hospital is calculated to meet the requirements of both Cavalry and Artillery.

39. Before this can be done it must be decided by Government what superficial area is required per man in well-raised and well-ventilated Barracks in a mild and healthy climate such as I have before described at this Station.

A Standard of Barrack accommodation must be fixed upon.

According to the decision of the Supreme Government 90 feet of superficial space is required in the Plains and 77 in Hill Stations.

40. In the Report of this Commission upon the Military Hill Station at Wellington I had before perusing Colonel Crommelin's Memoranda on Barracks recommended 75 feet of superficial space as sufficient on the Hills, and this Commission still considers this to be ample. But at Bangalore a greater allowance of space must be given both

85 square feet, superficial, recommended for adoption in Barracks.

in Barracks and Hospitals, and a medium rate of accommodation be fixed between Barracks on the Hills and on the Plains. After careful consideration this Commission is inclined to fix upon eighty-five square feet of superficial area as sufficient for Bangalore.

41. Another point to be considered in fixing an allotment of men to these Barracks is the recommendation of the Home authorities that long Barracks should be sub-divided so as not to contain more than 21 to 24 men in each apartment—(vide paras. 6 and 7 of recommendations, on page 2 of this Report.)

42. The plan of the Race Course Barracks can fortunately easily be altered so to conform to these suggestions, and in accompanying Plan C. the position of all cots is shown, giving to each man 85 square feet superficial and from 1,824 to 2,016 cubic contents.

43. The following tabular statement will show the exact numbers now contained in these Barrack Rooms of which 6 are now completed, from which it will be seen that there is no serious overcrowding, so far as the men are concerned ; but the families and the Band occupy the verandahs of some of these Barracks as a temporary measure, until their own quarters are constructed.

The sixth Barrack shown as not occupied as such in the following return was at the time of our inspection used as an Hospital.

Total No. to be accommodated at 85 square feet. 528



Detailed Statement of accommodation in one Block of the New Dragoon Barracks at Bangalore.

Block.	Rooms.	Description of room.	DIMENSIONS.			Superficial area of each room.	Cubic contents of each room.	Regulation No. at 1000 cubic feet.	Superficial area then afforded.	No. of cots at present in the block.	No. at 85 superficial area.	Cubic contents thus afforded.	Openings for Ventilation.	WINDOWS.			DOORS.			Open arches to adjoining rooms.	Remarks as to proposed use of each apartment.	
			Length.	Breadth.	Height.									Number.	Height.	Width.	Number.	Height.	Width.			
By Troops																						
Of Hussars and Artillery.																						
No.1	1	Enclosed Front Verandah.....	59	0 12	0 16 9	708	11,859	..	44	..	21	2084	5 Attics.	..	..	..	5	8	4	5	Day Room.	
	2	Barrack Room No. I.....	76	0 24	0 24 0	1824	43,776	..	41	26	..	..	12 "	..	..	..	1	8	6	10	Barrack do.	
	3	Enclosed Back Verandah.....	59	0 12	0 16 9	708	11,859	..	..	..	..	..	5 "	..	..	..	5	8	4	5	Dining do.	
	4	Enclosed Front Verandah.....	84	0 12	0 16 9	1008	16,884	..	..	..	..	..	7 "	..	..	..	7	8	4	7	Day do.	
	5	Barrack Room No. II.....	84	0 24	0 24 0	2016	48,384	48	42	27	24	2016	14 "	..	..	..	..	..	..	14	Barrack do.	
	6	Enclosed Back Verandah.....	84	0 12	0 16 9	1008	16,884	..	..	..	..	..	7 "	..	..	..	7	8	4	7	Dining do.	
	7	Enclosed Front Verandah.....	59	0 12	0 16 9	708	11,859	..	..	..	..	..	5 "	..	..	..	5	8	4	5	Day do.	
	8	Barrack Room No. III.....	76	0 24	0 24 0	1824	43,776	44	41	26	21	2084	12 "	..	..	..	1	8	6	10	Barrack do.	
	9	Enclosed Back Verandah.....	59	0 12	0 16 9	708	11,859	..	..	..	..	..	5 "	..	..	..	5	8	4	5	Dining do.	
No.2	10	Serjeant's Room I.....	20	0 14	0 16 9	280	4690	1+	..	1+	1+	..	{ 3 "	2	6	4	2	8	4	..	* The three Barrack Rooms now open into one by communicating archways they will require to be sub-divided by the closing of these openings. † 1 Serjeant married or single.	
	11	Room II.....	20	0 12	0 16 9	240	4020	..	..	..	..	1 "		..	..	..	2	8	4	..		
	12	Quarters. Bath Room.....	8	6	0 11 6	51	586	..	..	..	..	..		4 "	..	..	..	1	8	4		..
	13 to 15	Serjeant's Quarters as above..	..	..	..	..	..	1+	..	1+	1+	..	4 "	2	..	..	5	..	..	..		
	16 to 18	Serjeant's Quarters as above..	..	..	..	..	..	1+	..	1+	1+	..	4 "	2	..	..	5	..	..	..		
	19 to 21	Serjeant's Quarters as above..	..	..	..	..	..	1+	..	1+	1+	..	4 "	2	..	..	5	..	..	..		
	22 to 25	Troop Store Room Each....	15	6 12	0 16 9	180	3115	..	..	..	..	..	4 "	2	..	..	5	..	..	..		
	No.2	Dimensions exactly as No. 1.																				
	No.3																					
	No.4																					
	No.5																					
	No.6																					
No.7	No.7	Unfinished.																				
	No.7																					
	No.7																					
No.8	No.8	Unfinished.																				
	No.8																					
	No.8																					
Total No. to be accommodated at 85 square feet.											528											

* Used as an hospital.

66 Men and 4 Serjeants can be comfortably accommodated with the approved allowance of room in a single block. 3 Day-rooms, one in front of each small Barrack room, and three Dining rooms can also be allotted to one troop of Cavalry.

By this arrangement the views of the Home authorities will be as fully as possible carried out and all sanitary requirements sufficiently met.

45. For purposes of reference in this and other Reports, I submit (in Appendix C.) a detailed statement of the numbers of men of all ranks to be provided with Barrack accommodation. It will be seen that 66 cots will eventually be somewhat in excess of the total requirements of a troop of Cavalry. But as the 18th Hussars have only recently landed in India, it will probably be some time before the full percentage of married men will be reached.

46. It was proposed, I was informed, to provide in the 8 Barrack blocks, for the accommodation of one Regiment of Cavalry and two Batteries of Artillery. But this cannot be done if the standard of space which has been authoritatively laid down is observed, or even according to the reduced standard which is, in the opinion of this Commission, sufficient in such a climate as Bangalore.

47. When the Cavalry is accommodated, only one remaining block will be available for the Artillery. It will therefore be necessary to construct three new blocks of a similar size to those finished or under construction, in order to afford the required accommodation for the Artillery consisting of two Batteries.

48. Each Battery has of Corporals, Gunners, and Drivers 137 men, and of these 12 per cent. may be roughly estimated as married.* As each block will contain 66 unmarried men, the addition above described will be necessary to complete the four blocks to be occupied by Artillery.

49. If in the new blocks the orders of the Supreme Government were followed out regarding upper storied Barracks capable of containing a Troop or Company, then three upstairs rooms should be provided, and the lower apartments be used as Day and Dining rooms only.

* As shown in Appendices C and D, the strength of one Battery amounts to 137 men, and this reduced by 12 per cent. of married men would leave 121 men to be placed in the unmarried Barrack or 242 in all, in addition to the necessary increase that must be made to the married quarters. Of these 242, 60 (one quarter) could be accommodated in the 8th block remaining unoccupied after the Cavalry were accommodated, and it will be necessary to erect 3 new blocks of corresponding dimensions. But in this computation it is assumed that 12 per cent. of the Corporals and Rank and File are married, while practically it has been found that of the Cavalry only 8.9 per cent. and of the Infantry only 8.6 per cent. avail themselves of the privilege afforded them of marrying up to 12 per cent. The more correct plan therefore of estimating the actual average proportion likely to be married would be to obtain a return for several years showing the same details as are here afforded by a return dated 1st May 1864.

	Staff Serjeants.	Serjeants.	Rank and File.
	Percentage of married.		
Engineers.....	2.0	85.0	27.0
Artillery.....	91.0	61.7	14.5
Cavalry.....	64.7	42.8	8.9
Infantry.....	69.4	44.9	8.6

The following statement will therefore show the method of computation of Barrack room requirement of each troop of Cavalry and Battery of Artillery.

Arm.	Total strength.	Deduct Serjts. with separate accommodation.	Remaining.	Deduct for married as say	In Barrack Block.
Troop of Cavalry.....	72	4	68	9 per cent. = 6	62 in 3 rooms in 1 block.
Battery of Artillery.....	145	8	137	12 " " = 16	121 in 6 rooms in 2 blocks

50. At Bangalore, however, and more particularly on the Race Course, if additional Troop Barracks are erected, this Commission see no objection to the repetition of the present Barrack Block subdivided as described above. The total lengths of the wards might, however, admit of a slight reduction if only 60 unmarried men have to be provided for.

51. Hospital accommodation will also be required for these men, and this Commission has examined with great care the site and plan proposed for the European Cavalry and Artillery Hospitals. The site is well chosen, but there are many and serious objections to the plan of the Hospitals. The purport of our remarks on it (Vide Appendix E.) have been already submitted to His Excellency the Commander-in-Chief, who has been pleased to order the discontinuance of the works until a final decision is arrived at regarding the principles of Hospital construction for European Troops.

52. This Commission had not, when drawing up the letter alluded to in last paragraph, considered in detail Colonel Crommelin's papers on the subject of Hospitals for Europeans.

53. The views of this Commission on Colonel Crommelin's reports were laid before Government in my letter No. 605A, dated 31st March. (Appendix F.)

54. Although deferring to Colonel Crommelin's great experience in this matter, this Commission believe that their suggestions on Colonel Crommelin's plan contain important improvements and are deserving of consideration before a final decision is passed on the Bangalore Hospital.

55. Although the Government in their order dated 24th November on the Report submitted by this Commission on the Old Dragoon Hospital at Bangalore were not prepared at that time to accept the suggestion made by this Commission as to the advantage of substituting, at a large station like Bangalore, a General European Military Hospital in lieu of several District Regimental Hospitals, I would venture (as the construction of the New Hospitals on the Race Course for the Artillery and Cavalry has been stayed) again to press on His Excellency the Commander-in-Chief the advantages of a single Military Hospital for the whole of the European troops at Bangalore.

56. These are briefly—

(I.) That the Executive Staff of one Hospital is comparatively much less in number and expense than that of several Hospitals widely separated.

(II.) That by providing distinct pavilions for different corps all interference with Regimental discipline could be avoided.

(III.) That a single set of Administrative rooms, as Surgery, Committee room, Operating room, &c., would suffice, and that, at Bangalore, an admirable site would be afforded for instituting a General European Hospital.

(IV.) That the site occupied by the present Dragoon Hospital is highly objectionable, and the proposed site on the Race Course is within a reasonable distance of these Barracks.

(V.) That as the present old Dragoon Hospital requires to be considerably enlarged so as to make it sufficient for a full Infantry Regiment, and as this will be a source of considerable expense it would be much better that this should be incurred in completing one large Hospital, constructed on scientific principles, than in making additions to the old Dragoon Hospital; for

if these additions are designed on the principles now recommended by Colonel Crommelin they could not be made to agree in style with the Hospital which it is proposed to assign to the Infantry Regiment who will soon occupy the old Dragoon Barracks.

57. The decision of Government on the views expressed by this Commission on Colonel Crommelin's plans and recommendations must regulate any conclusion to be arrived on the subject of the proposed Hospital on the Race Course whether it be a General Military European Hospital or one for Artillery and Cavalry only.

Views of this Commission regarding Hospital construction.

58. The various subsidiary buildings on the Race Course, Cook-house, Wash-houses, Workshops and Quarters for Non-Commissioned Officers, &c., were all carefully examined by us, and the plans of them fully discussed by the whole Commission after our return to Madras.

Subsidiary Buildings.

59. The following observations with reference to them were submitted in great part to His Excellency the Commander-in-Chief through the department of the Quarter Master General.

59. The Canteen will be well situated in the centre of the Race Course Plateau, nearly equidistant from the several Barracks and Serjeants' Mess and Library.

Proposed Canteen.

60. The general arrangement and proportions of this building seem well calculated for its intended use. The size of the chief room seems also sufficient for the probable number of men who will resort to it. But as a whole Cavalry Regiment and a large number of Artillery will have to be accommodated, and as they generally resort to the place about the same time in the day, I would suggest that in lieu of (as is apparently intended) permitting the men to go for their supply of Liquor to the three small arched windows, opening from the Serve-out room into the main apartment and the adjoining Verandahs, a large arch should be thrown between the two rooms and a counter (say 4 feet high, 20 feet long and 2 in depth) be erected under this arch. If men could have access to a long counter like this, much of the struggling and confusion usually witnessed in Canteens might be avoided and no liquor need be taken into the Verandahs. Thus interchange of liquor, &c., could be avoided, and the men who get liquor would be more easily kept under observation.

Proposed slight alteration.

61. A hinged iron grating to turn up when the Canteen is open, and afterwards to be folded down, could, of course, be easily constructed, and the additional air thus admitted to the Serve-out room would tend to prevent the heavy and disagreeable smell usually observed in these places. The centre of the Counter should be made to open when required to the width of the length of a large Cask, as according to the present plan (if correctly drawn) all casks have to be introduced into the Serve-out room through windows.

Improvement in Ventilation.

62. At the time of our inspection the Provost yard was only partially erected, and on examination of the plan of it this Commission found it necessary to remark "that no indication was given of any means of admitting fresh air into the cells other than by openings 16 feet from the ground," and it was added, "possibly barred iron cell doors are intended, but these would somewhat prevent that entire seclusion which is contemplated in strictly solitary confinement; and as all the doors, facing inwards, are exactly opposite to one another, this difficulty of securing strict seclusion is rendered greater." But I have since learned with pleasure that although not shown

Provost yard.

in the plan due precautions had been taken to ensure ventilation and on examination at a later date, and when the building was nearly completed, the cells were found to be good and well-ventilated rooms.

63. There is, however, one fault in the design for them that should be avoided in places of this kind, namely, that only one privy was provided for the 20 prisoners.
 Latrine arrangement not approved.

64. This Commission is of opinion that separate and distinct Latrine accommodation should be provided for each cell, so as to prevent the necessity of the men having to be marched to and from the Privy room to meet the calls of nature. There are some difficulties in effecting this but it should be done if possible.

65. The apartments for Library and Recreation Rooms are situated very centrally and in a convenient position for all men in Barracks.
 Library and Recreation room. The rooms are well ventilated and airy, and well suited to their intended use. But as quiet is essential to the perfectly comfortable use of a Library and as a Recreation room may be more or less noisy, I think that the connecting door-way should be closed up. As the two rooms are well supplied with doors, I believe this closing up of one door-way would in no degree interfere with its ventilation.

66. The adjoining Serjeant's Mess is very neatly and tastefully fitted up, and is calculated to promote the comfort of this class of Non-Commissioned Officers.
 Serjeant's Mess.

67. A small Cook-room and Privy are to be attached to the Serjeant's Mess. The Cooking Range is after the native fashion, but as the use of this room will probably be confined to the preparation of tea, coffee, soup, &c., it would not be advisable to recommend any more extensive building or more costly apparatus.
 Out-buildings, Cook-Rooms.

68. The plan of the Privy showed a small building of brick and chunam with masonry partitions between the seats. This Commission would prefer to see this building composed in great part of corrugated zinc and iron worked on the dry earth system. A modification of the design forwarded with my letter No. 403 dated 12th December 1864, would at small cost meet the end in view.
 Privy.

69. The same observations apply to the plan of the Privy proposed for the Library. In these as in all Privies a Urinal should be provided and worked with sifted earth. A recess as for an ordinary closet seat should hold a vessel of sheet iron containing a sufficient quantity of dry sifted earth; and into this vessel directly, the men should pass the urine. To prevent the surrounding ground being wetted through carelessness, the urine tub should stand on a paved surface covered with a layer of dry sifted earth.
 Privy for Library.
 Urinal required.

70. In the morning—at midday—or each evening, the vessel should be removed and carried to a distance where its contents should be buried or otherwise disposed of; it should be replaced by another clean vessel $\frac{3}{4}$ filled with fresh earth. These vessels should be well painted inside and outside with coal tar once or twice a week, and as occasion offered should be exposed to sun heat when they are perfectly empty.
 Conservancy of Urinals.

71. A double Privy—each side to be provided with a urinal, would occupy less space be more sightly and be more easily worked than the two separate buildings designed, for the Serjeant's mess and library which are close together.

72. The Guard room Privy proposed is open to much objection both as to the materials of which it is composed and the heavy masonry screen wall behind it. Here, again, a urinal is provided at the end of the passage formed between this wall and the Privy itself. This is an objectionable arrangement. The Privy and Urinal should be in one apartment and the passage in rear of the seats should be covered and provided with receptacles for deodorized excreta and vessels for storing fresh earth. This alteration would convert it from a Privy on the Punjab system to one on the principle recommended by this Commission. A very small shed attached to the Privy would afford sufficient room for storing a few days' supply of Earth and Poudrette.

73. It is proposed to erect Married quarters for the Cavalry and Artillery in five blocks. Three of these blocks are designed to accommodate 15 families, and two to accommodate 7 families, each. Each of these quarters consists of two rooms, one 16×14 , and the other 12×8 . This latter room is in reality the back verandah enclosed. This plan for family quarters does not appear as good as that suggested by Colonel Crommelin, which would give two rooms measuring 16×14 , and 14×10 , with verandahs both in front and at the back. At Bangalore the married quarters on the present plan will have verandahs in front only. The subsidiary buildings of these quarters are also open to the objection of being too close to the sleeping room.

74. The close proximity of Cook-house and Privy ought to be avoided if possible, and this might be easily done by building them at opposite sides of the small compound in rear of the houses. The Privy and Cook-houses, respectively, of adjoining houses might be contiguous, and thus the distance from the main buildings to these out-houses could be somewhat increased.

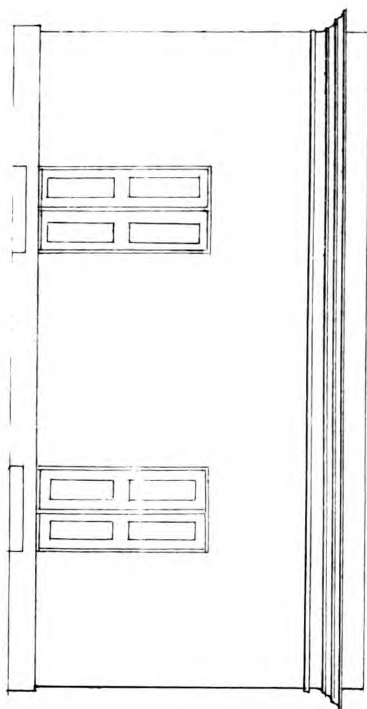
75. If the Privies are suitably built they might be worked on the dry earth system with rear openings—or a receptacle for Poudrette might be made adjacent to the Privy, which could be emptied by the Scavenger's carts. Similarly a receptacle for kitchen waste stuff, &c., might be erected outside and all refuse from the Cook-room might be discharged into it from a "shoot" or sloped opening in the rear wall of the Cook-room.

76. If possible the compound should be enlarged so as to remove these out-offices from close proximity to the sleeping room; and the door in the rear wall of the compound, now shown in the plan, might be dispensed with altogether, or if considered necessary it might open directly into the Cook-room. A space of only 6 feet now exists between this latter building and the only window of the one sleeping apartment of some of these quarters as now erected.

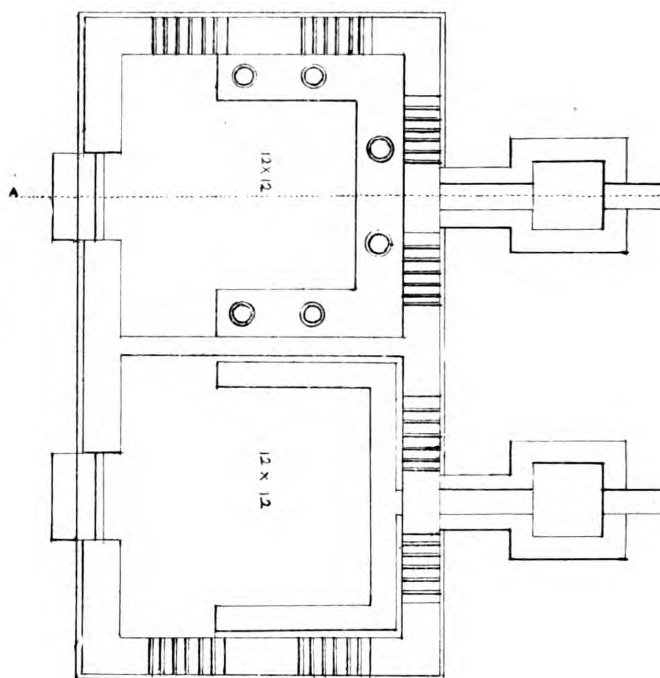
77. The observations contained in last para. regarding the unnecessary proximity of Cook-rooms applies to the Troop Serjeants' quarters and I have to submit similar recommendations regarding them.

Here however there would be no difficulty in introducing the door in the rear wall

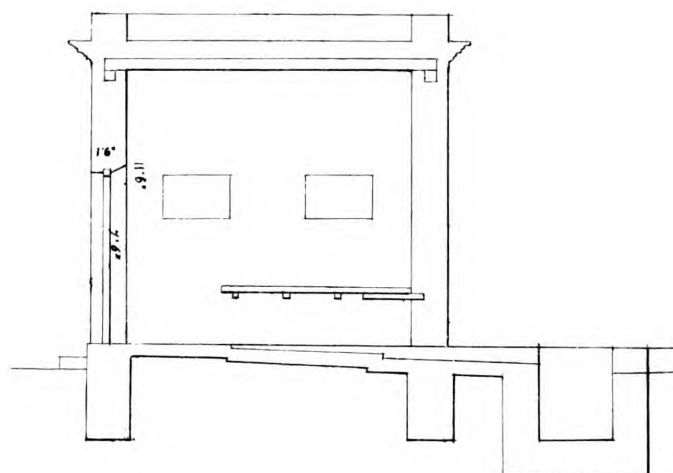
PLAN
OF A
WASH HOUSE FOR A BLOCK OF 7 MARRIED QUARTERS
FOR ARTILLERY
AT THE NEW DRAGOON BARRACKS ON THE RACE COURSE
AT BANGALORE



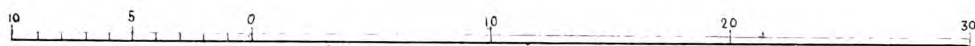
ELEVATION



SECTION THRO' A B



*Office of Sanitary Commission
H. B. Montgomery M.D. Sec^y
Drawn on transfer paper by F. D. Souza
Lithographed by A. Barren April 1865.*



between the out-buildings. It is to be regretted that in these plans the back room and passage are only 10 feet in height at some parts. The back bed room 12×8 is (with its average height of $11\frac{1}{2}$) scarcely more than sufficient for occupation by one adult.

78. The plan for the Urinary and Wash-house attached to these quarters showed a combination of out-buildings that is highly undesirable. A Urinary to be inodorous must be strictly dry, and this it can never be if it is either flushed out by, or in close proximity to, a Wash-house.

79. In my previous remarks on this subject (vide para. 69) I have dwelt upon what appear to this Commission should be the principles and materials of construction of these places. The design sent to the Commission was the usual standard plan of the Punjaub system, and the urine vessels were merely the air tight receptacles first designed by Dr. Hathaway; they simply retain the urine until the vessel is removed in the evening. Urine thus kept is always more or less offensive, and I would suggest the substitution of iron receptacles partially filled with sifted earth which will continue inodorous until thoroughly saturated with urine.

80. Due care should be taken to remove the foul water from the Wash-houses to a considerable distance from the vicinity of the Barracks.
Wash-houses.

Water with soap and organic matters in it is known to prove highly offensive if allowed to remain stagnant in chunam receptacles. The pit shown in the proposed plan might be entirely dispensed with and an open channel would effectually remove all water flowing from the Bath rooms. The V shaped granite channels so common in Bangalore would be well suited for this purpose.

81. The condition of the Wash-houses in use at the time of our inspection generally was not satisfactory. They were large apartments with Existing Wash-houses. tubs and a granite ledge for basins (portable). I think these large rooms might with great advantage be sub-divided into a Basin-room and a Bath-room. In the latter two reclining tubs, a shower bath and a small urinal should be erected; the latter to be cleaned out twice daily, and only to be used by persons bathing.

82. A plan of some other proposed wash-houses was laid before this Commission, and they reported to His Excellency the Commander-in-Chief regarding them that—

“The tile work ventilation openings 3×2 in the wash-houses, four in a block, are placed in a line $4\frac{1}{2}$ to $6\frac{1}{2}$ feet from the ground, and not only unnecessarily expose the persons washing to partial observation from outside, but also expose in face, neck, and chest to draughts of air. The openings should not in any place fall below a line $6\frac{1}{2}$ feet from the ground.

“The basins are to be put on ledges of wood, only 2 feet from the ground. These should be so raised that the bottom of the basins should be not less than 3 feet from the ground line for adults, and 2 feet for children. The basin openings are only 12 inches in diameter. A larger sized basin would be better, and if granite slabs could be substituted for wood, they might be found little more costly and much more durable.

“The pit for receiving foul water has no channel of exit except on the level of the top of it, and for this pit an open channel should be substituted, allowing water to flow off to a considerable distance.” (Vide Plan.)

83. The question regarding the erection of stables for the Cavalry and Artillery, has not been finally determined, or whether stables for sick Cavalry Lines and Stables. horses only are to be provided.

This Commission has, in a letter dated 10th April, strongly recommended that on account of the health of men and horses stabling should be built. A copy of this letter will be found in Appendix G.

84. The school rooms will be airy and well ventilated, and the only suggestion regarding them that I would make is, that some Latrine accommodation should be supplied in their vicinity for boys and girls (separately) and a urinal for boys. These buildings need not be expensive, and they are required to prevent the prolonged absence of pupils from the class rooms which must result if they are compelled to go home for these purposes.

85. The industrial employment of Soldiers in India has recently excited so much attention that I think sufficient accommodation in the way of workshops should be erected to give the men a fair opportunity of occupying themselves in this way, more especially at Bangalore, where the climate is temperate.

Only three buildings on the Race Course have been designed for this purpose, and they are to consist each of only 1 room 30 x 15'. If these are the only buildings to be devoted to this use on the Race Course, where some 800 men may be in Barracks, they are in the opinion of this Commission, insufficient.

Some of the workshops intended for noisy occupation should be well removed from Barracks, Hospitals, and family quarters.

86. The double Cook-rooms intended for 2 Troops and already erected are found to answer their intended use satisfactorily. They are airy and well ventilated, and they will when fitted with "Ranges" be quite fit for proper superintendence by European cooks as contemplated in the order of His Excellency Sir Hugh Rose. It is however essentially necessary that the Cook-rooms should be provided with Kitchen Cooking Ranges, if the Soldier's food is to be properly cooked.

These Cook-rooms should be provided with a good supply of cooking utensils and with tables suitable for dressing and preparing food. If this is done and if Grant's or Duff's Cooking Ranges are erected, their supervision by Europeans would be quite practicable and the Soldier would probably be supplied with more varied diet. The lighting of the room is not as ample as it should be.

87. One very prominent want in these Barracks is a good Plunge Bath. This should certainly be erected when the new Tank on the Ulsoor Rock is completed. In all Barracks water should be readily available for this purpose, and in a climate like Bangalore the men would probably resort freely to a Plunge Bath which need not be very expensive, as very light roofing would be a sufficient protection from sun heat.

88. Out-of-door recreations, Skittle Alley, Fives Court, &c., are to be erected, and a Gymnasium might with advantage be added to these. At this Station and at Wellington the climate would probably induce the men to take exercise as an amusement, but in warmer Stations it is in our opinion somewhat questionable how far men would willingly use a Gymnasium, unless it is made a part of their drill.

89. I cannot conclude this portion of this Report without directing attention to the defective mode of conservancy adopted and the very great want of a system of drainage for these splendid Barracks.

90. The Lavatories are placed close to the Urinals, and the foul water used in washing passes out to flush the channel of the adjacent Urinal. This arrangement should be at once discontinued and both the Urinals and Latrines should be worked exclusively on the Dry Earth System. The water from Lavatories, Cook-rooms, Family quarters and Barracks, should be carried off by open granite drains to a considerable distance to leeward of the Barracks and Hospitals—and the present underground drains which collect all these fluids into a cistern close to the Barracks should be closed up.

91. Without proper drainage these Barracks will become exceedingly foul and no time should be lost in preparing a complete scheme for efficient drainage. In a climate like Bangalore where light rain is of frequent occurrence the open drains would if properly constructed remain without smell and they could be easily flushed when rain does not fall. Under-ground drainage is so liable to get choked up and then to prove at once a source of nuisance and expense for repairs, that in the opinion of this Commission a system of open drains similar to those so frequently seen at Bangalore should be adopted. The natural drainage of the site of these Barracks is so good and the moisture caused by the rains is so quickly absorbed, that sub-soil drainage does not seem necessary.

92. Close to the Solitary cells of the New Artillery Barracks, the inhabitants of a neighbouring Horsekeepers' village manufacture bratties or cakes of dried manure used for fuel, in large quantities, and the ground is rendered highly offensive by the absorption of the fluid portion of these when exposed to dry. This practice should be interdicted in the close vicinity of these Barracks. The adjacent native village is gradually being extended so as to encroach on the Northern angle of the Barrack square. This should be prevented and the conservancy of this place (occupied chiefly by followers of the Regiments) should be put under Military control. Horsekeepers will be required for the Hussars and these men will require houses but it would seem highly desirable that regular lines should be laid out for them on a suitable site, and probably one could be found towards the North East, closer to the proposed site of the Lines or Stabling for Horses (vide Block Plan of Race Course Barracks.)

93. The village under notice is chiefly occupied by the Horsekeepers of the Royal Artillery, and its conservancy and drainage have been entirely neglected. In places it is one huge Latrine. Adjoining village—
There are no made drains—no level road—the whole place is cut up with nullahs and other water courses. Cholera has been known frequently to break out in this very spot, and it might be thus introduced among the Troops with the most serious results. If a line be drawn from the corner of the enclosure of the Horse Artillery Barracks to the "¼ mile post" on the Race Course it will indicate how much of this village should be removed. All huts to the South of this line should be at once demolished, and on some convenient adjacent site regular lines for Horsekeepers should be built and public Latrines erected. The importance of due attention being paid to this village should not be overlooked, —to be improved.
for from its close proximity to the Barracks, and from the unavoidable intercourse between the inhabitants of it and the Soldiers, it would probably be found that Cholera or Small Pox prevailing in the village would find its way rapidly to the Barracks, and an extension of the disease might occur.

But even under ordinary circumstances the village would probably be a nuisance from its defective conservancy, and it should be strictly supervised, and all extension of it prevented.

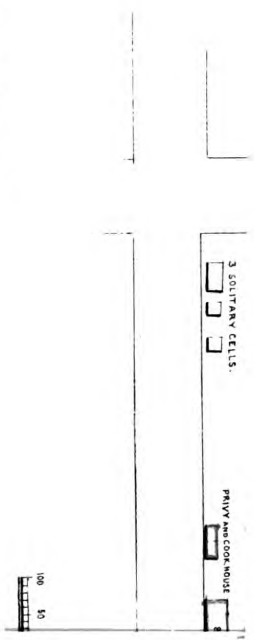
94. I next proceed to notice the recommendations in the foregoing remarks, which require the orders of Government :—
Recommendations of the Commission.

- (1.) That 85 square feet superficial area should be adopted as the fixed regulation standard for Europeans in Barracks at Bangalore.
- (2.) That three new Barrack Blocks be constructed or such number as may be required to accommodate at this standard, one Regiment of European Cavalry and two Batteries of Artillery if it is finally decided that this force should be placed on the Race Course.
- (3.) That a system of Drainage by open V shaped Granite channels should be constructed for these Barracks.
- (4.) That all Latrines and Urinals should be worked exclusively on the Dry Earth system as proposed by this Commission.
- (5.) That in all Barracks the men occupying any sleeping room should employ the adjacent closed Verandahs as Day and Dining rooms and that the lighting of Barracks be improved.
- (6.) That the Canteen should be improved as suggested in paras. 59 to 61.
- (7.) That in the construction of all future Latrines and Urinals the style of building proposed by this Commission should be adopted.
- (8.) That all Cook-rooms should be provided with Duff's or Grant's cooking ranges, a suitable supply of culinary articles, tables for cutting and preparing meat.
- (9.) That additional workshops should be built.
- (10.) That permanent Stabling should be provided for all horses.
- (11.) That future family quarters should be made to measure 16 × 14—and 14 × 10 in two rooms with verandahs front and rear.
- (12.) That family quarters should have the Cook-room and Privy separated.
- (13.) That suitable Latrine and Urinal accommodation should be attached to all schools.
- (14.) That a General Hospital should be erected on the Race Course for all European Soldiers in Bangalore.
- (15.) That a Plunge Bath be erected on the Race Course.
- (16.) That the native village close to the Northern Corner of the Race Course should be removed, and that the making of bratties, &c., and all other offensive occupations, as those of Butchers, Tanners, &c., should be interdicted in the vicinity of these Barracks.

OLD DRAGOON BARRACKS.

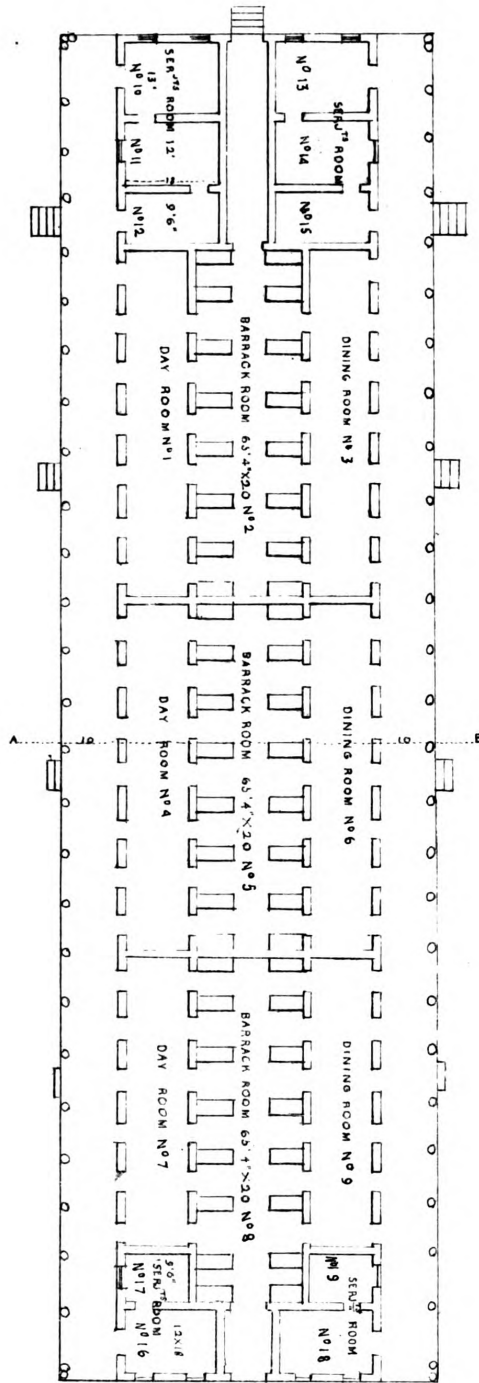
95. The Old Dragoon Barracks consist, as shown in the accompanying plan (marked D) of eight Barrack Blocks, an Hospital, Family quarters for 90 men, and the usual out-buildings of an European Regiment.
- Old Dragoon Barracks—

PLAN E
 SHEWING RELATIVE POSITION OF 48 COTS
 IN THREE SUB-DIVISIONS
 OF THE
 OLD DRAGOON BARRACK BLOCK AT BANGALORE.

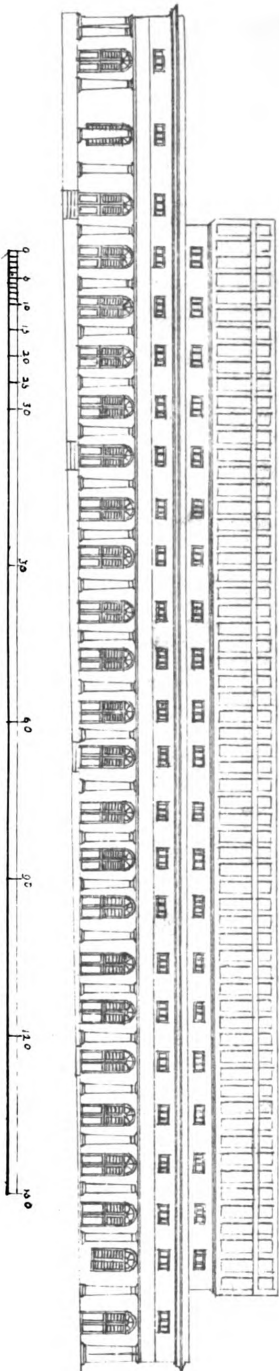




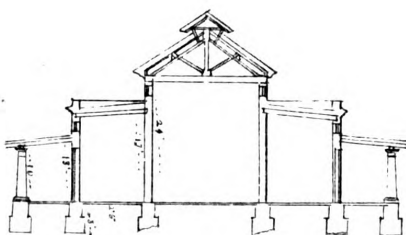
PLAN E
 SHEWING RELATIVE POSITION OF 48 COTS
 IN THREE SUB-DIVISIONS
 OF THE
 OLD DRAGOON BARRACK BLOCK AT BANGALORE.



FRONT ELEVATION



SECTION THRO' A.B.





96. It is intended that on the completion of the Race Course Barracks these buildings shall be given over to the European Infantry Regiment stationed at Bangalore and that the Infantry Barracks and Hospital lately occupied by the 66th Regiment shall be utilized for other Military purposes. As the strength of European Infantry Regiments considerably exceeds that of Cavalry Regiments it is at once apparent that in point of Barrack and Hospital accommodation these buildings will prove insufficient for a full Infantry Regiment. This Commission therefore carefully examined into the amount of accommodation now afforded, and the extent to which it should be increased with a view to rendering it adequate for its intended use.

97. The dimensions of each of the Barrack Blocks are given in the following table, and it will be seen from the plan accompanying this table that in point of construction these Blocks greatly resemble those on the Race Course. Thus, they each consist of a long verandah (open) at front and rear of the building; inside this is a closed verandah well ventilated by closed and open venetian doors, by ground ventilation and by swinging windows. In each Barrack the central room is partially divided into three parts of almost equal size; and by building up these arched openings these Barrack Blocks can, like those on the Race Course, be divided into three rooms.

98. In the Report of the Royal Commission each Barrack is said to be able to accommodate 88½ men, giving to each 1,000 cubic feet of breathing room. The fallacy of this calculation arises from overlooking the fact that to secure any given cubic space by simple loftiness of a room does not by any means imply that adequate superficial area is also given. The latter point is really of much greater importance, for if sleeping rooms are 15 feet high and they are seldom lower, and if adequate superficial area (75 to 100 square feet) is afforded, the cubic contents must be from 1,120 to 1,500 square feet, and this is ample.

These observations apply with much force to the Buildings now under notice as they are 25 feet high.

99. In the Barracks now under report each Barrack room would contain 16 cots with very nearly 85 square feet of superficial space per cot.

Capacity of each Barrack.

Although the allowance made here is slightly less than that proposed for the Race Course Barracks, yet it is considered sufficient because only 16 men sleep in one apartment and that apartment has ridge ventilation throughout. The advantages of this mode of ventilation are so fully alluded to in Appendices F and G of this Report, that I need not here repeat the arguments there urged.

100. Assuming that Government will acquiesce in the propriety of fixing a regulation standard number of occupants for this Barrack—and that they will sanction its sub-division into three rooms, then, if 16 cots are placed in each room, 48 of the unmarried men may be accommodated in each Block as at present built. This would give 384 men to be accommodated in the whole of the Blocks now erected as shown in accompanying Table and Plan.

101. I have with reference to the Race Course Barracks stated that this Commission is of opinion that 85 square feet is sufficient superficial area per cot at Bangalore, and it is at this standard that the Barracks now under notice can accommodate 384 men.

102. From Appendices C and D of this Report, it will be seen that a full European Infantry Regiment has in India 10 Companies each, comprising 4 Corporals, 2 Trumpeters, and 81 Privates. This gives 870 men to be provided with Barrack accommodation. But of these say 10 per cent. will be married (vide note on page 10), so that 783 men remain in the Barracks for unmarried men. As accommodation to the extent of 384 is now available, 399 men remain, for whom Barracks must be built.

Eight additional blocks will therefore be required, each to contain 50 men. If the present buildings are made the model for these—as for uniformity they would probably be—then I would suggest that, instead of the sub-division into 3 compartments, each to contain 16, each Barrack should be divided into 2 rooms, each to hold 25.

It will be seen from Plan D, that abundant space is available in the enclosure of the Barracks for 8 additional Blocks.

103. At the time of our inspection of these Barracks, seven of them were occupied by the King's Dragoon Guards then on the eve of their departure from Bangalore, and one was occupied by a portion of 2 Companies of H. M. 66th Regiment.

Overcrowding witnessed.

104. This Barrack Block was much overcrowded; 58 men occupied the Central Room, and 23 men were placed in each of the two enclosed Verandahs or 104 men in all. In the other Blocks the numbers contained were 50 in three instances, 49, 51, 46 and 43.

Of No. 5 Block $\frac{1}{2}$ was given up as a Recreation Room, and the front enclosed Verandah was occupied by 14 men, who, with 35 in the Central Ward, made up 49 as noted above, and in this Block there was some overcrowding.

105. If the plan of utilizing the Barrack accommodation recommended in the foregoing Report be adopted, then very suitable Sleeping, Day and Dining rooms will be provided for the Soldiers in these Barracks. But in one respect considerable improvement is needed. The lighting of these rooms at night is exceedingly defective. The oil lamps do not enable the men to read comfortably, and as they go into their Barrack rooms at 8 o'clock they are obliged to waste a good deal of time in a half lighted room. I would suggest that suitable lights should be supplied from dusk until 10 P. M. in the Day rooms, and that the men should be permitted to remain in these apartments until that hour. The cost to Government would probably be very slight, but this Commission believes that the comfort of the men would be greatly promoted and that this indulgence would be much prized by them.

Deficient light in Barracks.

106. Throughout the Barracks which are large and well ventilated, the saddlery is placed over the men's beds. This is a very defective arrangement in a Cavalry Barrack, which this was at the time of our inspection. It is destined to become an Infantry Barrack. A separate Saddle and, in the case of Artillery, a Harness room should be provided for all mounted Soldiers. On sanitary grounds it is objectionable that saddles should be placed in the Barrack room, and the cleaning of the saddles prevents the verandahs of the Barrack being kept clean. (Vide Appendix G.)

Saddlery should not be kept or cleaned in Barracks.

107. I have before remarked upon the fact that these Barracks are in many instances used for purposes for which they were not intended, and of this an example is seen in the present situation of the room devoted to the Recreation room.

It is formed out of a portion of the Barrack. It is more comfortably furnished than usual and is well frequented by the men. This and the Reading rooms might with advantage be located in the present Hospital which could be vacated if Hospital accommodation for this Barrack is completed on the Race Course, where this Commission has proposed to construct a General Military Hospital for the whole of the European Troops stationed at Bangalore, or if another Hospital which is much required is built in the Barrack enclosure. A place also could be afforded in the present Hospital for School rooms.

108. In this as in the other Barracks hitherto visited, the married quarters of the Staff Serjeants which form a part of the Barrack rooms are defective in the means of washing, and in any means by which the water used in the married quarters can be disposed of by drainage.

Serjeants' Quarters in Barracks.

At present small screens and tatties have been used to make bathing places and kitchens, Deficiencies in means of bathing and cooking. and all the water has to be removed by hand.

No necessary of any kind has been provided for these married quarters, and what is evidently intended as a Store room is used as a night closet and hence the screens erected in the verandah.

Bathing.

In future plans some provision should be made for a small dry Earth closet for the use of married Serjeants and their families and all bathing and cooking in verandahs should be strictly interdicted.

109. The Lavatories and Urinals are placed between the several Barrack blocks which is perhaps the most convenient situation for the men, but the Lavatories are open to the same objections that I have made to those on the Race Course. The Urine channel of the urinals is imperfectly washed out by the water from the Lavatory and the Urine lodging at the point of conjunction of two urine channels gives out a most offensive smell.

The same remedial measures should be adopted here as have been recommended for similar buildings on the Race Course, namely, the discharge of foul water from the Lavatory through some other channel and the working of the Urinal by the Dry Earth system of conservancy.

Remedy proposed.

110. The Wash-houses are very defective both in design and accommodation. No privacy is afforded to men anxious to have a thorough wash—no Foot baths are provided nor any special appliances for washing the feet.

Proposed improvement in Wash-houses.

111. In the opinion of this Commission it is necessary that close to all Barrack blocks should be attached two apartments, one simply for fixed basins fed by bib cocks—and the other fitted with two or three tubs and one or two reclining baths, with screens or curtains. Thus men would have placed at their disposal the means of effectual bathing and this without unnecessary exposure.

They should be close to Barracks.

One of the most prominent wants in this respect of these Barracks is a good Plunge Bath. This Commission would strongly recommend that one should be erected and the men encouraged to use it freely. At a considerable distance from the Barracks there are Bath rooms for the use of the men, but to be of practical utility such apartments should be close to the men, so that they could readily resort to them at all times of the day and in all weathers. The Bathing rooms now in use were part of the Cook-room, but were devoted to their present use in consequence of the want of Bathing rooms being recognized. They are fitted with tubs, and the only objection to them is their distance from the Barracks.

112. Close to them are the Cook-rooms, and these are on the old native plan of Cook-houses. Sanction has been given for the introduction of good cooking stoves. The cooking is at present conducted in kitchens upon the old native system, which causes the building to be unnecessarily dirty, and leads also to an unnecessary consumption of fuel.

113. From the accompanying Plan will be seen that there are two small blocks of Family quarters between the ends of the Barracks and the public road. The quarters themselves are small, close, and ill-ventilated, owing to the close proximity of the Barracks, and they interfere somewhat with the ventilation of the Barrack room. They also impede the passage along the end of the Barracks. These quarters are reported to be unhealthy and the out-offices attached to them are a source of nuisance to the adjoining Barracks. In the opinion of the Commission these 16 quarters, and the out-houses attached to them, should be removed, and the Barrack square wall be made only $4\frac{1}{2}$ to 5 feet high, so as to allow free circulation of air. The wall has already been lowered in some parts with great advantage. These quarters of which the removal is proposed are shown in red in accompanying plan.

Family Quarters.

Of the buildings intervening between the Barracks and Road, all except the gateway and Guard room, and room for the Officer on guard, should come down, and provision should be made in the Barrack enclosure for the buildings thus removed.

These buildings of which the removal is proposed are not well constructed, are not raised on any sufficient basement, and under any circumstances are objectionable. Their removal is strongly insisted upon by experienced Medical Officers and I think with sufficient reason.

While these alterations are being made—the adjacent Infantry Barracks which have hitherto been occupied by the 66th Regiment will afford accommodation for such portions of the Regiment as cannot be provided for until the additions to the Dragoon Barracks have been made.

114. There are 4 blocks of Married Quarters surrounding a Garden square as shown in Plan.

Married Quarters.

They accommodate 24, 24, 14, and 20 families respectively. They are neat in design but are open to the same objections as before urged against the plan of construction adopted in the Family quarters on the Race Course, although not identical with them as regards their dimensions. Two rooms measuring 16×14 and 14×10 accommodate one family.

115. The Guard House comprises a Main Guard room, Cells for defaulters, and a verandah.

Main Guard.

The Guard room is 26 feet high, 50 feet long, and 20 wide, with arched doorways. The Cell (or Ward) is 20×20 feet and of the same height, and there are 3 separate Cells $9-6$ by 10 but only $11-6$ in height. The verandah in front is really a part of the Main Guard which opens into it by doorways.

These buildings call for no special remark except as to the wooden trestle bedsteads used by the men on guard. The mattresses to them are inferior and should be improved. As I have already addressed Government on this subject, I need only refer to Appendix H of this Report as giving all suggestions on this subject in detail. In these, however, as in all other Guard rooms,

Furniture required.

a few chairs should form part of the Barrack furniture. It is desirable on the score of health that the men should not be reduced to the alternative of standing or lying in their beds; a few chairs would be a great comfort afforded to the guard at a comparatively insignificant cost.

116. The Privy of the Guard room was offensive in smell. It is now worked on the

Privy defective.

Punjaub system, but this does not prevent evil odours. The necessary alterations required to ensure the introduction of the dry earth system of conservancy should be made without delay.

117. The Solitary cells were formerly five in number, but of these two, at the South East

Solitary cells.

angle of the Barrack enclosure, have been removed, so as to provide a site for a water cistern. The three remaining Cells are small separate buildings 8×8 and $11\frac{1}{2}$ in height. The cubic contents thus afforded is only 736 feet. These Cells are seldom used and are only suitable for use during the cold weather. New Cells are in course of erection.

118. I may here allude to the desirability of erecting a Military prison at this Station in

Military prison recommended.

lieu of the various detached places of confinement scattered over the Station. This proposal has, I believe, already engaged the attention of His Excellency the Commander-in-Chief, and I trust that it will receive early attention.

119. The other subsidiary buildings attached to these Barracks do not require special notice.

Subsidiary buildings generally approved.

The dimensions of these several buildings are shewn in the accompanying tabular statement of Barrack accommodation. They are generally in good order, recent in construction and well suited to

Detailed Statement of accommodation in the Regimental Sergeants'

Block.	Rooms.	How OCCUPIED.	DIMENSIONS.			Superficial Area of each room.	Cubic contents of each room.	Regulation No. at 1,000 cubic feet.	Superficial area then afforded.
			Length.	Breadth.	Height.				
		1 Regimental Serjeant Major's Quarters.							
		Room I.	18	0 21	0 18	0 378	6,804		
		Room II.	10	0 21	0 18	0 210	3,780		
		Room III.	15	0 21	0 18	0 315	5,670		
		Room IV.	15	0 8	0 10	0 120	1,200		
		Room V.	10	0 8	0 10	0 80	800		
		1 Regimental Quarter Mr. Serjt's Quarters.	(same as for Regimental Serjeant Major.)						
		8 Troop Serjeant Majors' or Colour Sergeants' Quarters in 1 Range.							
		Room I.	12	0 7	0 13	7 84	1,141	...	...
		Room II.	12	0 16	7 9	0 199	1,791	...	...
		Room III.	12	0 15	0 13	0 180	2,340	...	...
		Room IV.	12	0 8	0 9	0 96	864	...	...
		3 Staff Sergeants' Quarters.							
		Room I.	14	0 15	0 17	0 210	3,570		
		Room II.	12	0 15	0 17	0 180	3,060		
		Room III.	27	0 8	0 10	0 216	2,160		
		1 Armourer Serjeant's Quarters.							
		Room I.	12	0 15	0 19	6 180	3,510		
		Room II.	14	0 15	0 19	6 210	4,095		
		Room III.	27	0 8	0 11	6 216	2,484		
		4 Sergeants' Rooms at the East Gate.							
		Room I.	28	0 22	0 12	0 616	7,392	...	...
		Room II.	8	5 22	0 12	0 185	2,222	...	...
		Room III.	9	9 11	0 12	0 107	1,287	...	...
		Room IV.	9	10 10	0 12	0 98	1,180	...	...
		1 Librarian's Room.....	17	8 9	8 10	6 171	1,793	...	...
		1 Canteen Serjeant's Quarters.							
		Room I.	15	9 12	0 16	0 189	3,024		
		Room II.	15	6 12	0 16	0 186	2,976		
		Room III.	8	0 12	0 16	0 96	1,536		
		1 School Master Serjeant's Quarters.							
		Room I.	20	0 9	0 8	0 180	1,440	...	...
		Room II.	20	0 9	0 8	0 180	1,440	...	...
		1 Orderly Room Serjeant's Quarters.							
		Room I.	12	0 24	0 19	9 288	5,688	...	...
		Room II.	12	0 12	0 17	6 144	2,520	...	...
		Room III.	12	0 12	0 17	6 144	2,520	...	...
		Family Quarters, or Rank and File.							
		Room I.	16	0 14	0 14	0 224	3,136		
		Room II.	9	0 9	0 9	0 81	729		
		GUARD ROOMS.							
		1 At the Conjee dry rooms. { Men's.....	25	5 18	0 15	9 457½	7,205		
		{ Serjeants'.....	8	0 8	0 15	9 64	1,008		
		1 Quarter or front Guard Room. { Men's.....	50	0 20	0 22	6 1000	22,500		
		{ Serjeants'.....	8	6 18	8 17	6 159	2,777		
		{ Men's.....	25	0 16	0 13	0 400	5,200		
		{ Serjeants'.....	15	9 7	6 8	0 118	944		
		1 Prison room at the front guard.....	20	0 20	0 22	6 400	9,000		
		3 do. do. do. do. each.....	9	6 10	0 11	6 95	1,092		
		2 do. do. at the Conjee dry rooms each.	24	0 18	0 18	6 432	7,992		
		3 Solitary Cells, each.....	8	0 8	0 11	0 64	704		

and Librarian's Quarters of the Old Dragoon Barracks at Bangalore.

Number of cots at present in each room.	Number at 85 superficial area.	Cubic contents thus afforded.	Opening for Ventilation.	WINDOWS.			DOORS.			Open arches to adjoining verandahs.	REMARKS.
				Number.	Height.	Width.	Number.	Height.	Width.		
...	...	...	4 Attics.	2	6.0	3.9	4	8.0	4.0		
...	...	...	4 "	3	6.0	3.9	2	8.0	4.0		
...	...	...	4 "	3	6.0	3.9	2	8.0	4.0		
...	...	...	...	1	6.0	3.9	2	8.0	4.0		
...	...	...	...	1	6.0	3.9	2	8.0	4.0		
...	...	...	...	1	5.6	3.6	2	7.0	4.0		
...	...	...	...	2	5.6	3.6	3	7.0	4.0		
...	...	...	...	1	5.6	3.6	3	7.0	4.0		
...	...	...	...	1	5.6	3.6	2	7.0	4.0		
...	...	...	1 "	2	6.0	4.0	2	7.0	3.6		
...	...	...	1 "	1	6.0	4.0	2	7.0	3.6		
...	...	...	2 "	1	4.0	3.0	2	7.0	3.6		
...	...	...	2 "	1	5.0	4.0	2	7.0	4.0		
...	...	...	4 "	3	5.0	4.0	2	7.0	4.0		
...	...	...	...	5	5.0	4.0	1	7.0	4.0		
...	...	...	...	2	3.6	3.0					
...	...	...	...	1	4.0	3.0					
...	...	...	...	1	3.6	3.0					
...	...	...	...	1	3.6	3.0					
...	...	...	...	1	3.6	3.0	...	...	...	...	The Doors.
...	...	...	...	1	3.6	3.0					
...	...	...	...	1	3.6	3.0					
...	...	...	...	6	4.0	3.6					
...	...	...	...	2	6.0	5.0					
...	...	...	...	2	6.0	5.0					
...	...	...	...	1	5.6	3.6					
...	...	...	...	1	4.0	3.0					
...	...	...	...	4	6.0	5.0	...	...	...	...	} Vide remarks in Paras. to
...	...	...	3 "	..	1.6	3.0	...	...	...	...	
...	...	...	...	4	4.0	3.0	...	...	...	...	
...	...	...	...	1	4.0	3.0	...	...	...	...	
...	...	...	...	3	2.0	2.0	...	...	...	...	
...	...	...	...	1	1.6	1.1	...	...	...	...	
...	...	...	...	...	...	...	1	7.0	4.0	...	
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	

* Are ventilated by Barrack opening 8 feet from ground protected by sunshades.

the purposes to which they are applied. They were examined in detail by this Commission, who have no suggestions to make for their improvement except as regards the following particulars.

120. The Latrines for Non-Commissioned Officers and Privates, and containing 12 seats in two buildings for the former and 42 seats in 8 buildings for the latter, were clean, but though Coal tar was freely used they were decidedly objectionable in odour. A raised foot-path to these houses has been recently made.

It will be observed from Plan D that these buildings have their rear wall on the line of the public road; and doubtless this is the reason why, although constructed on the Punjaub plans, they have never been adapted to that system, and the rear openings have not been made, which are essential to its being carried out. This Commission would recommend that these Privies should be re-constructed and that they be adapted to the Dry Earth system of conservancy. Scavengers' carts should have free access to the building through which doors should be pierced and the nuisance would be avoided, of which complaint is made as arising from the wooden tubs for excreta which have to be carried from the Latrine to the gateway with a view to the removal of their contents.

121. There are two Wash-houses intended for the use of women, but one of these is temporarily employed as a School-room. These Wash-houses for women are closed daily at 4 P. M., an arrangement which is objectionable when it is borne in mind that there are no arrangements for bathing in the Family quarters. The internal fittings of these Wash-houses are so arranged as to furnish each with 8 separate compartments. The buildings are lofty, well-ventilated, and of recent construction, and the only objection to be urged against them is that they are far removed from the married quarters. Indeed, one of them temporarily used as a School is most inappropriately placed close to the Canteen and in the vicinity of Latrines for men.

The neighbourhood of these places renders it very desirable that this building should not be used hereafter either as a Wash-house or School; but a suitable Wash-house for women should be built close to each block of family quarters.

122. I have in the earlier portions of this Report alluded to the character of the water in Bangalore generally (vide paras. 25 to 28). I again refer to it with reference to these Barracks as there has been a good deal of complaint as to the character of water supplied to the Troops placed here. Should the system of water-supply for the whole Station be carried out as proposed, then a Cistern in the Barrack yard here will contain a sufficient supply. At present the water is derived from wells close to the Ulsoor Tank; and the knowledge of this fact renders it of the utmost importance that the conservancy of this sheet of water should be strictly attended to.

It has been found that in dry weather the water in these wells is exceedingly scanty and indifferent in quality, and this to such an extent as occasionally to necessitate the use of water drawn from the wells usually used for watering horses who are then sent to the Ulsoor Tank to be watered.

It is scarcely necessary to add that there is considerable objection to these means of meeting the present deficient water-supply.

123. Dr. Jephson reports as regards food, "The diet of the men is furnished by the Commissariat Department, and consists of 1 lb. meat, 1 lb. bread, 1 lb. vegetables, 4 oz. rice, 1 oz. salt, 2½ oz. sugar, 1½ oz. coffee, or ½ of tea, to each man. The rations are good, and the native Cooks cook the rations according to the fancy of the men; some have the meat curried, others will have it fried, while others have it boiled. Considering that there are no cooking ranges, the rations are very well cooked."

"The men in addition to their rations allowed by Government have invariably something more for breakfast, either eggs, beef steaks, or bacon.

"3 Annas 4 Pie is the Government deduction for each man's rations. Half the vegetables consist of potatoes, and the other half are mixed, such as carrots, onions, turnips, &c., and are very good and conducive to health. The Porter, Beer and Arrack are furnished by Government, but the Porter and Beer are at times rather acid."

124. With reference to Dr. Jephson's concluding observation, this Commission desire to record that wherever they have had an opportunity of examining the Commissariat supplies of Beer and Porter, they have been invariably struck with the remarkably sound condition in which these liquors were found. And without desiring to impugn in the slightest degree Dr. Jephson's statement, we are inclined to refer to accident any occasional failure as regards the quality of these articles.

125. The Canteen is a large building 60 by 32 feet and 17 feet in height. The apartment is well ventilated now, its deficiency in this respect having been brought to notice by the Surgeon of the Dragoon Guards.

126. The clothing provided for the men is well adapted to the climate, but warm clothing is much more used here than at almost any other Station in the Presidency, except Wellington.

As I have recently addressed Government on the subject of bedding to be provided for European Soldiers generally, and as the whole subject is awaiting the orders of the Supreme Government, it is unnecessary that I should do more than refer to the opinions expressed by this Commission and which are re-printed in Appendix H.

127. In conclusion, I beg to direct attention to the fact that several of the present buildings, as Line Guard Room, Slingshed, Gram Boiler, Sick Horse Stable, Gram Godown, &c., will be no longer required when an Infantry Corps is placed in these Barracks; and in all probability the health of the men in Barracks will be improved by the removal of the present Horse Lines, the proximity of which to Barracks is objectionable.

128. I have already addressed the Government on the subject of the Hospital in this Barrack, and have strongly urged the necessity of its discontinuance.

The Government in their Order dated 28th November 1864, were not prepared to consider the arguments then used as conclusive in respect of the unhealthiness of the building as an Hospital, and it was intimated that alterations would be made to the building with a view to its continuance as a Military Hospital.

I am unwilling again to advance my own opinion, but I venture to submit the following extract from a recent Inspection Report by Dr. Mackenzie, the Deputy Inspector General of Hospitals—who is an Officer of acknowledged talent and experience—and to submit that there is ground for a re-consideration of the decision of the Government. Dr. Mackenzie writes as follows:—

"The Hospital, in all the conditions under this head, remains in precisely the same state as noted in my Inspection Report of last year.

" If the definition of an unhealthy Hospital given by Mr. Simon, the Medical Officer of the Privy Council, London, be accepted as correct ;—' that by *reason of some fault of its own*, disease cannot be treated successfully in it,' then is this building a very unsuitable one ; and with reference to the Proceedings of Government, on the Inspection Report submitted by the President, Sanitary Commission, on the 30th September 1864, I would beg permission most respectfully to observe that after upwards of two years' experience and constant inspection, I am persuaded that it is so radically defective and faulty as to be incapable of improvement without absolute re-construction. The Quarter Master General of the Army has shown that all that could be suggested to remove its defects has been already carried out. I am therefore of opinion that any further temporary alterations will be fruitless waste of money.

" Captain Tulloch, the Executive Engineer here, was good enough to go over the buildings with me yesterday morning, and I have his authority for stating that he does not think that the most careful drainage will in the least, or at all events, but to a very slight degree, rectify the dampness of the wards. 'There are errors in their construction,' he says, 'which cannot be remedied except at so heavy a cost as would be unadvisable for Government to incur'—and he adds, ' I formed this opinion in 1862, and have no reason whatever to alter it in 1865.'

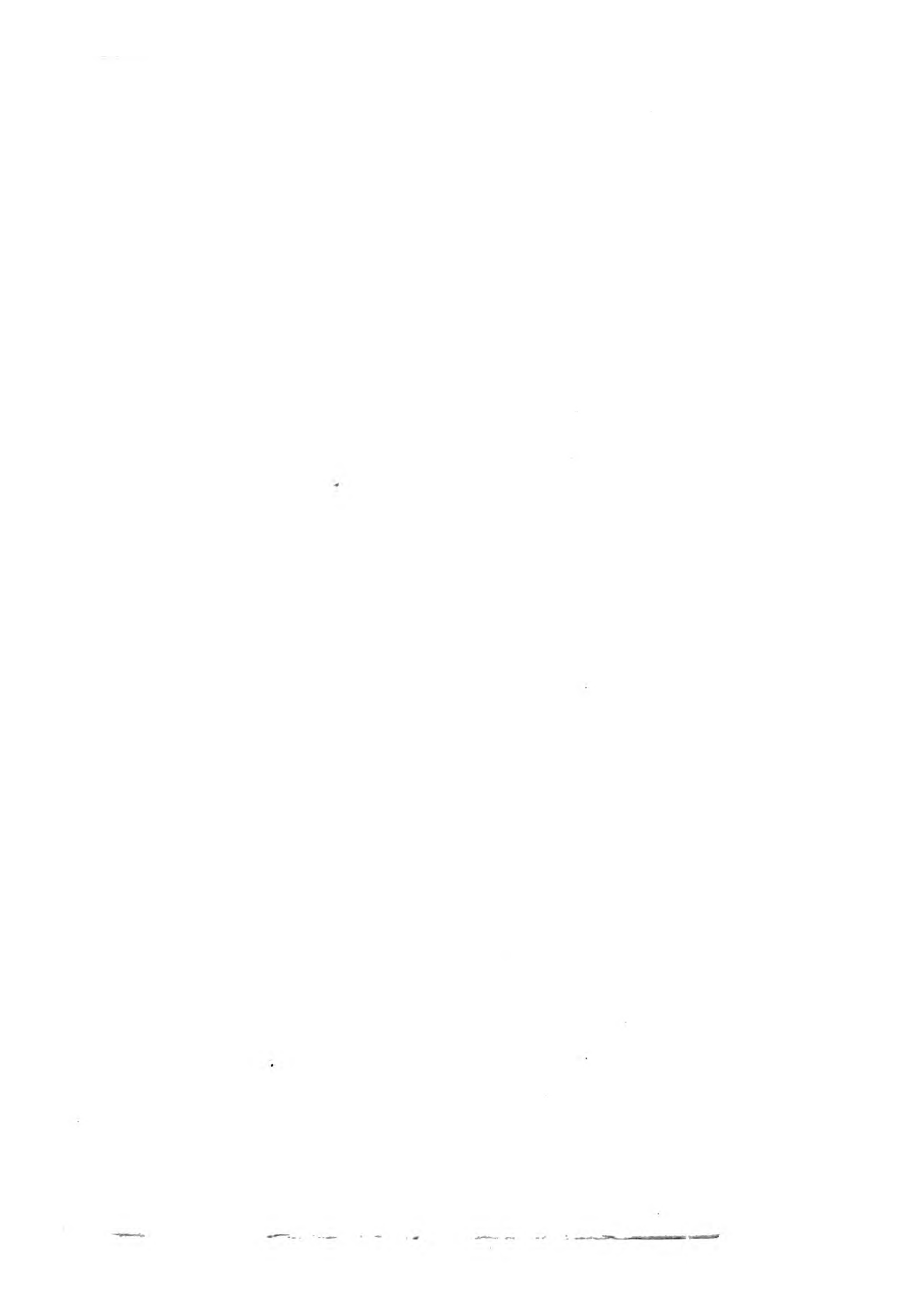
" I am not at present in a position to show by figures how much the ailments of the patients have been aggravated, and their recovery opposed by this Hospital atmosphere, but that this has been, and will continue to be the case to a large amount, especially in the rainy and cold seasons, I can assure the Principal Inspector General. Since, then, an entire re-construction and further accommodation to nearly double the extent of the present wards will be required when the Infantry Regiment is moved into the Hussars Barracks, my belief is, that it will be a saving to Government, in money and men, to abandon the present site altogether, and have a new Hospital built in the close vicinity of those now in course of erection for the Artillery and Cavalry. Here it would occupy an open, isolated, and elevated position, having a free and unobstructed exposure to the prevailing winds ; whereas the present locality is comparatively low, and shut in on three sides by the Barracks and dwelling houses.

" I am quite sure that this arrangement would prove greatly to the comfort and benefit of the sick, and I may add that I believe Deputy Inspector General Inglis is entirely of the same opinion."

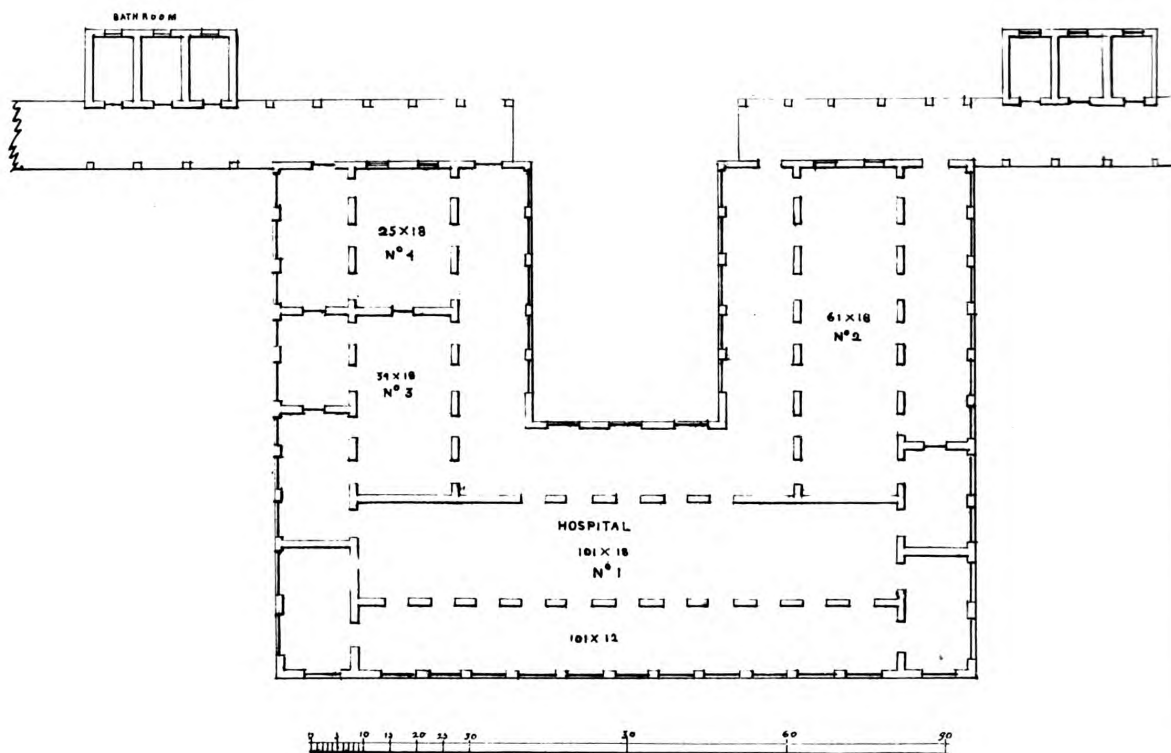
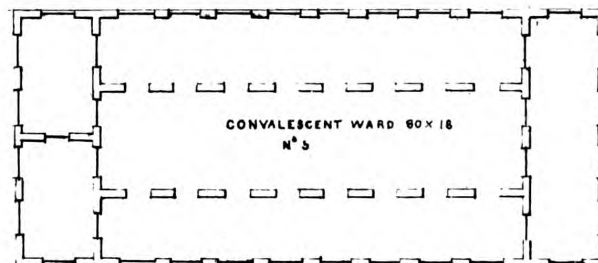
In the Report of the Royal Commission appointed to enquire into the sanitary condition of the Army in India, the evidence regarding this Hospital was unanimous in condemning it, and this Commission ventures again to suggest that this building should only continue to be used as an Hospital until a new one can be built.

As proposed in my former letter, the Men's Hospital could be readily converted into a Workshop, or Recreation rooms ; and the Female Hospital could be used as a Regimental school.

Description of Hospital Out-houses.						Length.	Breadth.	Height.
Serjeants' Quarters.	...	...	...	...	...	34	12	14½
Office and Store room.	...	...	...	...	...	42	15	15
Conicopoly's store.	...	...	...	...	...	28	15	15
Guard room.	...	...	...	...	...	20	15	15
Bath houses.	...	...	...	...	...	31	15	11
Latrines.	...	...	...	...	...	51	23	14
Sheds for sick carts.	...	...	...	...	...	20	20	10
Cook houses.	...	...	...	...	...	43	20	16
Lamp Lighter's godown.	...	...	...	...	...	0	0	0
Native Hospital Ward.	...	...	...	...	...	43	25	16
Dead house.	...	...	...	...	...	18	18	0



6
GROUND PLANS
OF
SICK WARDS
OF THE OLD DRAGOON HOSPITAL AT BANGALORE



THIS PLAN IS NOT DRAWN ACCURATELY TO SCALE

*Office of Sanitary Commission.
H. P. Montgomery M.D. Secy.
Drawn on transfer paper by F. D. Souza.
Lithographed by A. Barrere. April 1865.*

These out-buildings would afford ample space for workshops of various kinds, and the building itself could be thoroughly utilized.

The accompanying plan and statement of dimensions of the Hospital sufficiently prove how entirely inadequate it is to meet the requirements of an European Infantry Regiment.

Wards.	Length.		Breadth.		Height.		Superficial area.	Cubic contents.	Regulation number of Patients.	For each patient.		Number at 100 sq. ft. superficial area.	Height of bed from floor.		Windows and ventilating attics.			Distance from foot of one bed to foot of opposite bed.	Distance between adjacent beds.		
	Ft.	In.	Ft.	In.	Ft.	In.				Superficial area.	Cubic contents.		Ft.	In.	Number.	Height.	Width.				
No. 1	101	0	18	0	15	6	1818	1817	28	64.93	1006.76	18	1	6	20	1	3	3	0	4	0
„ 2	61	0	18	0	15	6	1098	17019	12	91.50	1418.25	11	1	6	16	1	3	3	0	4	0
„ 3	34	0	18	0	15	6	612	9486	9	68.00	1054.00	6	1	6	8	1	3	3	0	4	0
„ 4	25	0	18	0	15	6	450	6975	5	90.00	1395.00	4	1	6	8	1	3	3	0	4	0
„ 5	80	0	18	0	15	6	1440	23040	23	62.60	1001.73	14	1	6	20	1	3	3	0	4	0

Regulation number of beds at 1000 feet cubic space ... 77

Number at 100 superficial area ... 53

129. This Commission desire to submit the following recommendations regarding the occupation of the Old Dragoon Barracks and the improvements required to promote the health and comfort of the troops occupying them.

(1.) That at the standard of 85 square feet only 48 men exclusive of Serjeants be accommodated in each of the old Dragoon Barracks.

(2.) That the additional barrack accommodation needed for a full Infantry Regiment be provided by the erection of additional Barracks.

(3.) That each Barrack be subdivided into 3 compartments as shown in plan, and that the better lighting of the Barracks be enforced.

(4.) That suitable Latrine accommodation be provided for the families of married Serjeants in Barracks.

(5.) That the lavatories and urinals for men be cleaned separately, and that dry earth conservancy be adopted in both urinals and latrines.

(6.) That the wash-houses be improved so as to secure more privacy to persons bathing.

(7.) That the two blocks of family quarters now existing between the end of the Barracks and the public road be removed, and a low wall be erected as a Barrack enclosure.

(8.) That the furniture of the Guard Room be improved so as to promote the comfort of the men on duty and that the Privy attached to the Guard Room be adapted to the Dry Earth System.

(9.) That a General Military Prison be built at Bangalore.

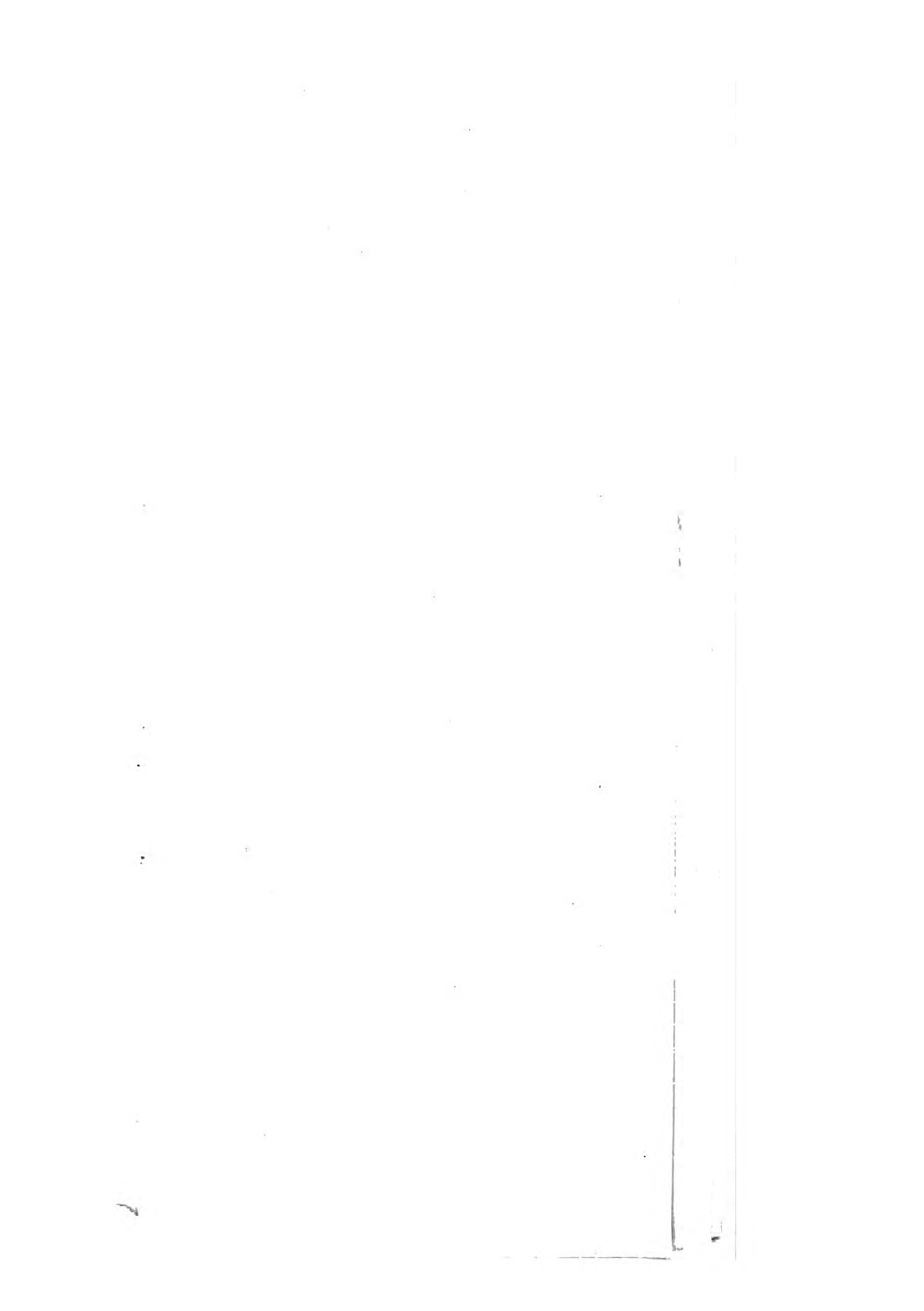
(10.) That wash-houses be built for women close to each block of family quarters.

(11.) That the proposed new water supply for these Barracks should be as soon as possible effected.

12. That the Beds and Bedding be improved as recommended by this Commission.

13. That the Hospitals for Males and Females be no longer used for this purpose and that they be converted into Recreation and School Rooms for the European Infantry Regiment.

14. That the sick be treated in one General European Hospital to be erected on the Race Course.



ROYAL HORSE ARTILLERY BARRACKS.

130. In style of general construction these Barracks are identical with those now in course of completion on the Race Course—and those of the old Dragoon Barracks. The rooms are lofty, well-ventilated and airy, although they are not as capacious as those of the Dragoon Barracks.

131. The same standard of superficial space should be here adopted as that recommended for the other buildings, and these rooms should be similarly sub-divided. As the information required to indicate the views of the Commission is contained in the accompanying statements and plan, it is not necessary to enter again upon these several topics which have been sufficiently discussed with reference to the other Barracks.

132. The following brief remarks are therefore simply intended to direct attention to the several points in which it is necessary that improvements should be made in order to render these Barracks equally healthful and comfortable to the Soldier as the other Barracks will be, should the recommendations of this Commission be carried out.

133. From the accompanying plan F it will be at once seen that only 48 men can be accommodated in one Barrack building sub-divided as shown therein, and as the two Barracks are of equal dimensions only 96 men, unmarried, can be accommodated in them.

134. The Corporals, Rank and File of one Brigade of Royal Horse Artillery will amount to some 150 men, and if 12 per cent. be deducted as the probable number married, then 132 men will require Barrack room. Of these 132 men only 96 can occupy the two existing Blocks and the remaining 36 must be accommodated in a new block which, for the sake of uniformity, should be made on the same plan as those now in existence, but in the designs for this additional block such improvements as are suggested in the present buildings should be planned.

135. Saddlery and Harness should be removed from these Barracks and placed in separate Harness rooms, (as has been done at Kamptee) or should be provided for in the stables recommended by this Commission.

136. The beds in this Barrack are open to the same objections as have been made to those elsewhere in this station, and should be re-placed by Iron trestles with wooden planking, and a good coir mattress be supplied to each cot.

137. These large Barracks are only provided with 6 hanging lamps which yield a very indifferent light. This want should be rectified.

138. The Serjeant Major's quarters at the end of the Barracks require additional ventilation, which could be effected by tubular shafts through the terraced roof. The drainage of the same places requires to be improved as noted in the old Dragoon Barracks (para. 108 of this Report) for there is not sufficient provision made for the removal of dirty water, slops, &c. from those apartments.

139. The Lavatory assigned to each of the Barrack blocks is much too small, and no decency can be observed by the men in washing. New lavatories should be built.

Lavatories are too small.

140. The Cook-rooms are too small, and they should be furnished with proper stoves.

Cook-rooms deficient in cooking apparatus.

141. The Privies are small and ill-ventilated, and should be re-built on some convenient site. At the west end of the block on the side of the road there is a good site for a Privy. The present Privy of the A Troop is too near the family quarters. I propose the removal of the present Privy of the west end Barrack. It is, as stated before, too near the married quarters, not sufficiently ventilated, and being an old building it should be removed. More privacy should be secured by having light iron screens between the seats. Neither in Regimental Bath rooms nor Privies is any attempt made to secure decency.

Privies.

Proposed site for other out-buildings.

142. Supposing this to be done, the new lavatories, Cook-rooms and Privy for the other block would face the Barracks and render them complete.

143. The present hospitals, for males and females, have been condemned, and the sick of the Horse Artillery are to be transferred to the new Race Course Barracks. These hospitals would, with a few minor improvements, serve for Recreation, Reading room, and Work-shops.

Proposed use of Hospitals.

Reading rooms.

144. For the Reading room seats with backs have been promised: tables should also be given.

The drain which is in front of the Barrack is too far from the Barrack itself, and no means have been afforded for rain water from the roof being carried away. The present stone drain should be shifted nearer to the Barrack. Spouts and gutters constructed, so that the rain-water should not make the ground immediately in the front of the Barrack verandah muddy and wet are much required.

Drainage defective.

145. The rooms occupied in the Eastern end of the Barrack by the married Serjeants require to be protected from the morning Sun. This might be done by a light verandah with corrugated iron roofing.

Serjeants' quarters much exposed to the sun.

NATIVE HORSE ARTILLERY LINES.

146. The lines of the Native Artillery, which will before very long cease to form part of the Artillery were visited. They are kept clean, but have no regularly paved drains. A side drain is under construction on one side of these lines—but the drainage of these lines should be thoroughly attended to, for a considerable portion of these lines will remain useful for the horsekeepers and grass cutters, &c., &c., attached to the Horse Artillery.

Drainage is being improved.

HOSPITAL FOR ALL ARTILLERY.

147. The Hospital in which the sick of the Artillery were treated at the time of our visit was a building totally unsuited to an Hospital and has been long condemned. The appended statement shewing the dimensions of the Wards sufficiently indicates the propriety of this decision. It will be seen that in the Male Wards, only 17 patients can possibly be accommodated. In the female 15, and in the Native Wards only 6. At the time of our visit to Bargalore 16 patients were in Hospital, so that a very few additional admissions would have caused over-crowding. But independent of the insufficient space afforded by the Hospital, it is entirely unfitted for its present use by the style of its construction, which is that of an ordinary Bungalow with enclosed Verandahs, and by its position, which is close to the Cook-rooms, Privies and Lavatory of the Horse Artillery Barracks which lie in front of it, and by the proximity of the Sick Horse Lines which lie immediately behind it.

148. Instead of having a suitable basement it is raised only about 18 inches above the level of the ground, from which unhealthy exhalations and moisture find their way into the Hospital. From its peculiar construction there is no possibility of securing separation for cases of epidemic disease, and the divisions between the several Wards are incomplete as they either open into one another or into enclosed Verandahs, these latter being on the level of the ground.

149. I need scarcely add that in the opinion of this Commission it is highly desirable that the erection of the new Hospital on the Race Course should be expedited as much as possible so as to render unnecessary the continued use of this building which might then be converted into Recreation rooms and Workshops.

Detailed Statement of accommodation in the Hospitals of the Royal Artillery.

Block	Rooms.	HOW OCCUPIED.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	Regulation No. at 1,000 cubic.	Superficial area then afforded.	No. of cots at present in each room.	No. at 100 superficial area.	Cubic contents thus afforded.	Openings for Ventilation.	Windows.			Doors.			Open arches to adjoining Rooms.	REMARKS.
			Length.	Breadth.	Height.									Number.	Height.	Width.	Number.	Height.	Width.		
No. 1	1	Ward.	63 0	20 9	15	1037	19,608	20	51	...	10	1,960	6	10	5 2	3 0	5	7 0	4 0	...	Verandahs on both sides [closed by wooden Jalousies.
	2	Ophthalmic Ward.	20 9	11 10 15	15	245	3,682	4	61	...	2	1,841	1	...	...	...	2	7 0	4 0	...	For cases requiring seclusion.
	3	Spare room (enclosed Verandah).	26 0	12 0	8	312	2,496	2	156	...	3	832	...	1	3 6	2 1	2	6 6	5 1	...	
	4	Store room (Verandah).	20 9	12 0	8	249	1,992	...	...	...	2	...	...	2	2 0	3 6	1	6 6	3 7	...	
	5	Surgery (Verandah).	20 10 12 0	8	8	250	2,000	2	125	...	...	...	...	1	5 2	3 0	2	6 6	3 0	...	
	6	Spare room (Verandah).	20 10 12 0	8	8	250	2,000	2	125	...	2	1,000	...	1	5 2	3 0	1	6 6	3 0	...	
No. 2	1	Ward.	29 7	19 8	22 0	581	12,799	13	44	...	6	2,133	10	...	...	...	2	8 2	4 0	6	[sides, 3 Jalousies in each.
	2	Female Ward, 1.	23 0	11 10 16 0	16 0	272	4,354	4	68	...	3	1,451	...	...	...	...	2	8 2	4 0	...	Closed Verandahs on both
	3	Female Ward, 2.	23 0	11 10 16 0	16 0	272	4,354	4	68	...	3	1,451	...	...	...	...	2	8 2	4 0	...	Do.
	4	Office.	23 0	11 10 16 0	16 0	272	4,354	4	68	...	...	...	...	...	...	...	2	8 2	4 0	...	Do.
	5	Spare room.	23 0	11 10 16 0	16 0	272	4,354	4	68	...	3	1,451	...	...	...	...	2	8 2	4 0	...	Do.
Out-houses	1	Cookroom.	15 0	8 0	10 6	120	1,260	...	...	...	...	...	3	...	...	...	1	6 4	3 0	...	Five openings on floor.
	2	Latrine.	15 0	8 2	10 6	122	1,286	...	...	...	...	...	2	...	...	...	1	6 0	3 0	...	
	3	Lavatory.	25 10	7 0	10 0	180	1,808	...	...	...	...	...	...	2	1 1	3 3	2	6 0	3 0	...	
Near Sick House	1	Ward 1.	19 10	16 9	11 6	332	3,820	4	83	...	3	1,273	2	3	5 0	3 0	2	7 0	4 1	...	{ For Native sick-open Ve-
	2	Ward 2.	16 9	9 10 11 6	16 4	1,894	1,894	2	82	...	2	947	...	2	5 0	3 0	1	7 0	4 1	...	randahs on both sides.
	3	Spare room (detached).	14 9	7 11 8 0	11 6	934	1,934	1	116	...	1	934	2	2	1 3	2 10	1	6 0	3 0	...	
	4	Latrine (detached).	11 10	6 10 10 6	8 0	849	849	...	...	...	...	...	2	...	...	...	...	...	...	1	
		Dead room	16 8	12 8	10 0	211	2,111	...	...	...	...	...	...	4	4 0	3 0	1	7 0	3 6	...	

BANGALORE, }
8th November 1864. }

150. The quarters of the Hospital Serjeant are much spoiled and rendered dark and close by the enclosing of the front verandah. As owing to the delay in completing the new Hospital on the Race Course the present Horse Artillery Hospital will probably continue in use for some time, I think it would be well if ridge ventilation were at once introduced into this building.

Hospital Serjeant's quarters should be ridge ventilated.

151. At the conclusion of this Report I will comment on the number of men of all branches of the Artillery under treatment in this and other Hospitals.

Health of Soldiers.

152. A small Native Hospital for the Native Horse Artillery is situated close to the European Artillery Hospital. It is small but usually the number of sick is very limited, and on the occasion of our inspection only 1 native Artilleryman was under treatment.

Native Hospital.

153. The Canteen is well arranged, it was under repair with a view to the introduction of ridge ventilation. The Serjeants' Mess House is neatly furnished and reflects great credit on the Non-Commissioned Officers.

Canteen and Serjeants' Mess.

154. Part of one of the Barrack rooms is used as a Game and Recreation room. No tables are given by Government to this Institution, but benches with backs have been indented for.

Game and Recreation room in Barrack block.

155. The Hospital having been condemned will eventually be available for employment as a Recreation room. When it is so, this part of the Regimental establishment should be removed into it, and the Barrack space thus liberated should be devoted to its proper use.

How to be eventually provided for.

156. The present Horse lines are well situated, all that is required is that a sufficient number of stables for the protection of the Artillery horses should be constructed on this site on the plan recommended by this Commission.

Horse lines.

157. The Officers of the Horse Artillery are unanimous in their opinion that there would be a real economy in the health of the men and horses if they are placed under cover.

Harness room.

A small harness room in a detached building is used by the native Troops of Artillery who cannot keep harness in their own huts.

Schools.

Boys.

Attached to these Barracks are schools for adult Soldiers and for boys and girls. The Boys' school has an average attendance of 25 boys, who study from 9 to 12, and from 2 to 4 o'clock daily. The room is small but well ventilated, and is neatly furnished. One apartment is used by adults. The Girls' school has an average attendance of 56 children who are educated by a trained School Mistress.

Girls.

158. The Boys' school had not, when we were at Bangalore, a trained Teacher. It appears probable that, if a competent person were appointed, the number of adult pupils would probably increase, and this is very desirable.

Teachers.

159. A small dark room is allotted to the use of the Moonshee who is educating these men in Hindoostance.

160. This Commission would strongly urge upon His Excellency the Commander-in-Chief the desirability of erecting a good school room in closer proximity to the Barracks and married quarters, and they trust that an efficient teacher may soon be made available for the Boys' school.

Out-of-door recreation.

A good skittle alley is provided for the men and a quoit ground.

Plunge Bath required.

A good Plunge Bath should be provided for the men of the Royal Horse Artillery.

Workshops.

Workshops are in course of erection from the debris of an old Gymnasium which fell down a short time ago.

161. The accompanying tabular statement will shew the accommodation of the Regimental Sergeants' Quarters in the Horse and Foot Artillery at Bangalore.

Detailed Statement of Accommodation in the Regimental Sergeants' Quarters of the Horse Artillery at Bangalore.

Block and Rooms	HOW OCCUPIED.	DIMENSIONS.			Superficial area of each room. Cubic contents of each room.		WINDOWS.			REMARKS.
		Length.	Breadth.	Height.			Number.	Height.	Width.	
	2 Sergeants' Quarters between the ranges.	" "	" "	" "						
	Room I. } for each {	18 0	12 0	10 4	216	2232	2	5-0	4-6	
	Room II. }	16 4	12 0	7 6	196	1470	1	5-0	4-6	
	1 Schoolmaster Serjeant's room.....	12 0	18 0	12 0	216	2592	1	5-0		
	1 Hospital Serjeant's Quarters.									
	Room I. }	10 10	14 10	14 4	160	2303	1	4-0	3-6	
	Room II. }	12 10	14 10	14 4	190	2728	1	4-0	3-6	
	Apothecary's Quarters.....	11 10	14 10	14 4	175	2516	1	4-0	3-6	
	1 Regimental Serjeant Major's Qrs.									
	Room I. }	13 10	16 10	12 6	233	2910	1	5-0	4-0	
	Room II. }	13 10	16 10	12 6	233	2910	2	5-0	4-0	
	Room III. }	14 0	8 0	7 8	112	858	1	4-0	3-6	
	Room IV. }	8 0	8 0	7 8	64	490	1	4-0	3-6	
	1 Regimental Qr. Master Serjeants' Quarters.									
	Room I. }	24 0	17 0	9 10	408	4012	4	5-0	4-0	
	Room II. }	13 10	17 0	9 10	235	2312	3	5-0	4-0	
	Room III. }	38 3	12 0	9 7	459	4396	2	5-0	4-0	
	8 Sergeants' Quarters in one Range.									
	Room I. } for each {	14 0	17 0	12 0	238	2856	8	5-6	5-0	
	Room II. }	14 0	12 0	11 3	168	1890				
	Standard Guard-room.....	35 0	16 0	14 0	560	7840	4	5-0	4-0	
	2 Prisoner rooms, each.....	16 0	16 0	14 0	256	3584				
	2 Solitary cells, each.....	8 0	8 0	10 0	64	640				

Detailed Statement of accommodation in the Regimental Sergeants' Quarters of the Foot Artillery at Bangalore.

2	Serjeant's rooms in centre of the two Ranges, each.....	17	6	17	9	13	7	310	4219	
1	Staff Serjeant's Quarters.									
	Room I.	16	0	14	11	11	6	238	2744	2 5-6 4-6
	Room II.	10	0	14	11	11	6	149	1715	2 5-6 4-6
1	Guard room.....	25	0	14	4	11	3	358	4031	3 5-6 4-6
1	Prisoner room.....	16	6	14	0	11	3	231	2598	1 5-6 4-6
1	do. do.....	27	0	8	0	7	3	216	1566	2 2-0 3-0
1	Solitary cell,	8	0	8	0	10	0	64	640	
1	Conjee house,	14	0	8	0	10	0	112	1120	

FOOT ARTILLERY BARRACKS.

162. The Foot Artillery Barracks are situated to the N. W. of the Race Course, on which stand the new Dragoon Barracks. The health of the Troops in these Barracks has always been remarkably satisfactory, and probably may be expected to improve on the completion of some alterations now being carried out—and some others which I now suggest for consideration.

The measurements of the Barracks given in the following table show that they are capable of containing 52 men exclusive of Serjeants, with an average of 85 superficial area and 1,456 cubic contents.

Detailed Statement of accommodation in the Rooms and Verandahs of A Battery, 23rd Brigade, Royal Artillery.

Block.	Rooms.	HOW OCCUPIED.	DIMENSIONS.			Superficial area of each room.	Cubic contents of each room.	Regulation No. at 1,000 cubic feet.	Superficial area then afforded.	Number of cots at present in each room.	Number at 85 superficial area.	Cubic contents thus afforded.	Openings for ventilation.	WINDOWS.			DOORS.			REMARKS.
			Length.	Breadth.	Height.									Number.	Height.	Width.	Number.	Height.	Width.	
No. 1.	{	1 Barrack Room.....	119	19	16	9 2261	37,872	37	61	33	26	1456		12	2	3	6	8	4	
		1 Serjeant's Room.....	17	19	16	9 323	5,410	5	64	3	3	1803		2	2	3	3	8	4	
		1 Serjeant's Room.....	17	19	16	9 323	5,410	5	64	3	3	1803		2	5	4	3	8	4	
		1 Barrack Room.....	119	19	16	9 2261	37,872	37	61	32	26	1456		12	2	3	6	8	4	
		1 Guard Room.....	25	15	15	6 375	5,812	5	75	...	4	1453		3	5	4	1	8	4	
		1 Prison Room.....	16½	14	15	6 231	3,580	3	77	...	2	1790		1	5	4	1	8	4	
		1 Office Room.....	15	22½	16	0 337	5,400	...	...	...	...	...		2	5	4	1	8	4	
		1 Store Room.....	12	8	10	0 96	960	...	...	...	...	...		3	1	6	1	6	3	
		1 Serjeant's Mess.....	27	14	16	0 378	2,268	...	...	...	...	...		5	5	4	2	8	4	
		2 Prison Room.....	15	8	10	0 120	1,200	1	120	...	1	1200		2	2	3	1	8	4	
" 2.	{	1 Cook Room.....	30	11	14	0 330	4,620	...	...	...	...	...		1	4	3	2	7	4	
		1 Cook's Store Room.....	10	10	14	0 100	1,400	...	...	...	...	...		...	...	...	1	7	4	
" 3. Canteen	{	2 Cook Room.....	15	9	10	0 135	1,350	...	...	...	...	...		...	...	...	2	6	4	
		1 N. C. Officer's Room.....	13	10	14	0 130	1,820	...	...	...	...	...		2	4	3½	2	6	4	
		1 Canteen Serjeant's Room.....	13	10	14	0 130	1,820	...	...	...	...	...		1	4	3½	2	6	4	
		1 Rank and File Room.....	37	21	17	0 777	13,209	...	...	...	...	...		2	4	3½	6	6	4	
		1 Store Room.....	13	10	14	0 130	1,820	...	...	...	...	...		...	...	...	2	6	4	
" 4. Library	{	1 Reading Room.....	56	20	16	9 1120	18,760	...	...	...	...	...		8	5	4½	6	8	4	
		1 Librarian's Room.....	9	10	14	0 90	1,260	...	...	...	...	...		1	5	4½	1	8	4	
		1 Store Room.....	9	10	14	0 90	1,260	...	...	...	...	...		1	5	4½	1	8	4	
		2 Store Room.....	9	10	14	0 90	1,260	...	...	...	...	...		1	5	4½	1	8	4	
		1 Tailor's Shop....	9	10	14	0 90	1,260	...	...	...	...	...		1	5	4½	1	8	4	

163. The long rooms have been recently much improved by the introduction of ridge ventilation through their whole length, and though Barrack rooms recently ridge ventilated. not of good design they are comfortable, and, with the out-offices, allow of the unmarried Soldiers being fairly housed.

164. The churchyard in close proximity is, however, decidedly objectionable, and should be closed as soon as possible for the sake both of Adjacent churchyard is objectionable. these and the new Dragoon Barracks as well as on account of the families of the Foot Artillery who reside in close proximity to it.

165. Two verandahs run at the front and rear of these Barracks; of these one towards the public road is closed and used as a Saddle room, and Verandahs front and rear. the other towards the Barrack yard is open.

166. I am decidedly of opinion that the close proximity of this Saddlery is objectionable both as necessitating the constant closing of all the doors and windows in this verandah (and thus preventing thorough ventilation of the Barrack room) but also as tending to attract insects and to pollute the air, as harness is always more or less saturated with oil and perspiration.

167. In this as in other Barracks I would strongly recommend that separate and distinct Saddle rooms should be provided as close as convenient to the Barrack rooms or in the Horse stables. In the present case the opening of the doors and windows of the verandah thus used would greatly improve the ventilation of the Barrack room.

168. The Guard room is small but well ventilated by 3 windows and 1 door. But as those modes of ventilation are under control by the men, and it is but too likely that they might be closed by them, I think complete ridge ventilation should be given as in the Barrack—and the same recommendation applies to the Prison room which is smaller and less thoroughly ventilated, having only 1 door and 1 window and no thorough draft.

169. The Cook-room, a narrow badly ventilated apartment, is in bad repair. At the time of our visit (during the preparation of breakfast) the smoke and heat were intolerable and such as would prevent any European superintending the cooking. The flooring was flagged and uneven, and cannot possibly be kept clean.

170. A new Cook-room should be built—airy and well ventilated, with Grant or Duff's Cooking range, and suitable tables for cutting and preparing food in a cleanly manner.

The Privies in this Barrack were small and somewhat offensive, although coal tar had been freely used in them. Earth had been imperfectly used in them, but much greater care should be taken in its use and a suitable shed for storing it should be provided.

171. The Latrine intended for the Punjaub system of conservancy but with wooden seats and wooden tubs is situated near the Barracks. This ought to be altered so as to suit the dry earth system, and then the full advantage of this plan of conservancy would be more apparent than it now is in this and other parts of this Cantonment where it has been very imperfectly tried.

172. The Wash-house is a small octagonal building which is too small and allows no possibility of bathing with any regard to decency.

173. Solitary cells are used for Prisoners. They are both small and ill-ventilated apartments and one of them is without any Latrine accommodation. The other which has this accommodation has been condemned. One good Military Prison would be preferable to these places of confinement (vide also para. 118). Confinement in close ill-ventilated cells, such as those under notice, can scarcely fail to act injuriously on the health of Prisoners.

174. A small building formerly known as the Foot Artillery Hospital is now used as a Reading room. Suitable lights were being provided for it. In this as in the other Reading rooms the furniture is deficient, and not calculated to promote the comfort of the men resorting to this place.

175. The Canteen is the only part of these Barracks which was dirty and uncomfortable. I have so frequently brought before the notice of Government the views of this Commission regarding the management of Canteens, that I need not here repeat my observations; but I trust the recent orders of the late Commander-in-Chief in India will be strictly carried out, and an improvement in this branch of Barrack management be thus effected.

176. The married men of this branch of the Artillery are accommodated in small cottages in close proximity to these Barracks. These buildings are small, ill-ventilated, and very insufficient in point of accommodation. They are rented by the men who usually pay two to three Rupees per month, the rent being defrayed by Government.

177. I have before adverted to the desirability of removing all saddlery from Barracks and made the requisite suggestions as to the disposal of these articles, but it is, I believe, uncertain whether or not these Barracks are to be abandoned, on the completion of those at the Race Course. They have recently been much improved and, so far as their capacity allows, are suitable for occupation; but if they are continued in use by European Troops, Workshops should be provided for the men.

178. The Soldiers' Gardens of the whole force of the Artillery and European Infantry Regiment are situated close to the Barracks now under report; they are very neatly kept. It is in the opinion of this Commission highly desirable that a Plunge Bath should be erected in these Gardens to be supplied from the Shoolay tank. This Bath should be screened off, so as not to be visible from the public road which runs between the Shoolay tank and the Soldiers' Gardens. The water used for the bath could be afterwards employed to fertilize the Gardens.

179. The Shoolay tank, like the larger one of Ulsoor, is liable to become rather low during the hot weather, and possibly might then be unequal to supply the Plunge Bath with an abundance of water. It will be necessary therefore to adopt measures to increase the storage of water in this tank and to lessen its area—while all rain-fall drainage should be conducted into it, and the present tributary of it (a channel conveying surface drainage from the village of Shoolay) should be protected from contamination by natives.

180. The necessity for this precaution being taken, will be more apparent when it is mentioned that two large public Latrines are situated in its close vicinity, and from the known habits of the native population it is not improbable that this stream is resorted to for the purposes of bathing after these places had been visited,

181. The following recommendations are made regarding the Barracks and Hospitals of the Horse and Foot Artillery at Bangalore.

Recommendations.

- (1.) That the standard of 85 square feet superficial area should be adopted for all men, exclusive of Serjeants, to be accommodated in the Barracks.
- (2.) That additional Barrack accommodation should be provided at the same rate for such men as may require it—the number to be thus provided for to be fixed by the Military authorities.
- (3.) That the drainage of the Barrack Blocks and especially of the Serjeants' quarters therein, should be at once improved.
- (4.) That all saddlery and harness should be as soon as possible removed from Barrack-rooms or Verandahs, and that suitable apartments for the safe custody of these should be provided either in detached buildings or in the stables recommended by this Commission, should these latter be approved by Government.
- (5.) That the beds and bedding should be improved as recommended in Appendix H of this Report.
- (6.) That the present Lavatories be removed and suitable ones erected, each to contain, in separate rooms, fixed baths and basins respectively.
- (7.) That new Cook-rooms and Privies be erected, that they both be well ventilated, and that the latter be so constructed as to be worked strictly on the Dry Earth principle.
- (8.) That the present Hospitals for Artillery when no longer required for their present use, be converted into Recreation rooms and Workshops.
- (9.) That suitable stabling be erected for all Horses.
- (10.) That new and improved School rooms be erected in closer proximity to the married quarters of the Horse Artillery.
- (11.) That a good Plunge Bath be constructed in the Soldier's Gardens.

MAIN GUARD.

Main Guard.

shut by the European Guard on duty.

183. The Officer's room is an indifferent apartment barely furnished and extremely uncomfortable.

184. Behind the Main Guard building two privies were found; one of these, intended to be worked on the Punjaub system and for use by Europeans, was found in an exceedingly filthy condition and the proposed Conservancy system had never been carried out in this privy.

Privy for Europeans.

185. A small privy intended for use by the Natives on duty was found greatly slopped with water and smelling most offensively. The necessity of preventing Natives bathing within the limits of any privy used by them has been so frequently pointed out by this Commission, that it is scarcely necessary that I should do more than record our opinion that positive orders should be issued on the subject, and that here, the comfort, and perhaps the health, of the men on guard should not continue to be endangered by this practice.

Privy for Natives.

Recommendations.

186. These two privies should be re-constructed and worked carefully on the "Dry Earth" system.

BARRACKS OF INFANTRY REGIMENT.

Barracks of Infantry Regiment.

187. These Barracks were occupied till very recently by Her Majesty's 66th Regiment.

188. As soon as the New Cavalry Barracks on the Old Race Course are completed, it is proposed to abandon these Barracks, the Infantry Regiment being transferred to the present Cavalry Barracks.

189. The buildings have recently been put in repair and improved. I would suggest that they might be utilized for Commissariat Stores and for the Arsenal.

190. At present the Arsenal is located in the Bangalore Fort separated from the Cantonment by the pettah, a distance of nearly two miles. I believe the distance of the present Arsenal from the Troops has been pronounced objectionable by competent Military authorities.

191. 5,000 Rupees are, I learn, to be expended in alterations to the Arsenal in the Fort, and it seems very desirable that no expenditure should be incurred on an Arsenal in the Fort which will be hereafter abandoned.

192. There is ample space in the enclosure of the 66th Barracks for the necessary buildings required for the Arsenal, and the Barrack rooms would afford admirable accommodation for the Commissariat Serjeants, &c. &c., who are not admissible in Regimental Barracks and who could here be accommodated close to their place of duty.

193. The only portion of this Barracks which was examined in detail by this Commission, was the Hospital for the treatment of the Regimental sick, and this will no longer be required on the transfer of the Regiment to the Old Dragoon Barracks.

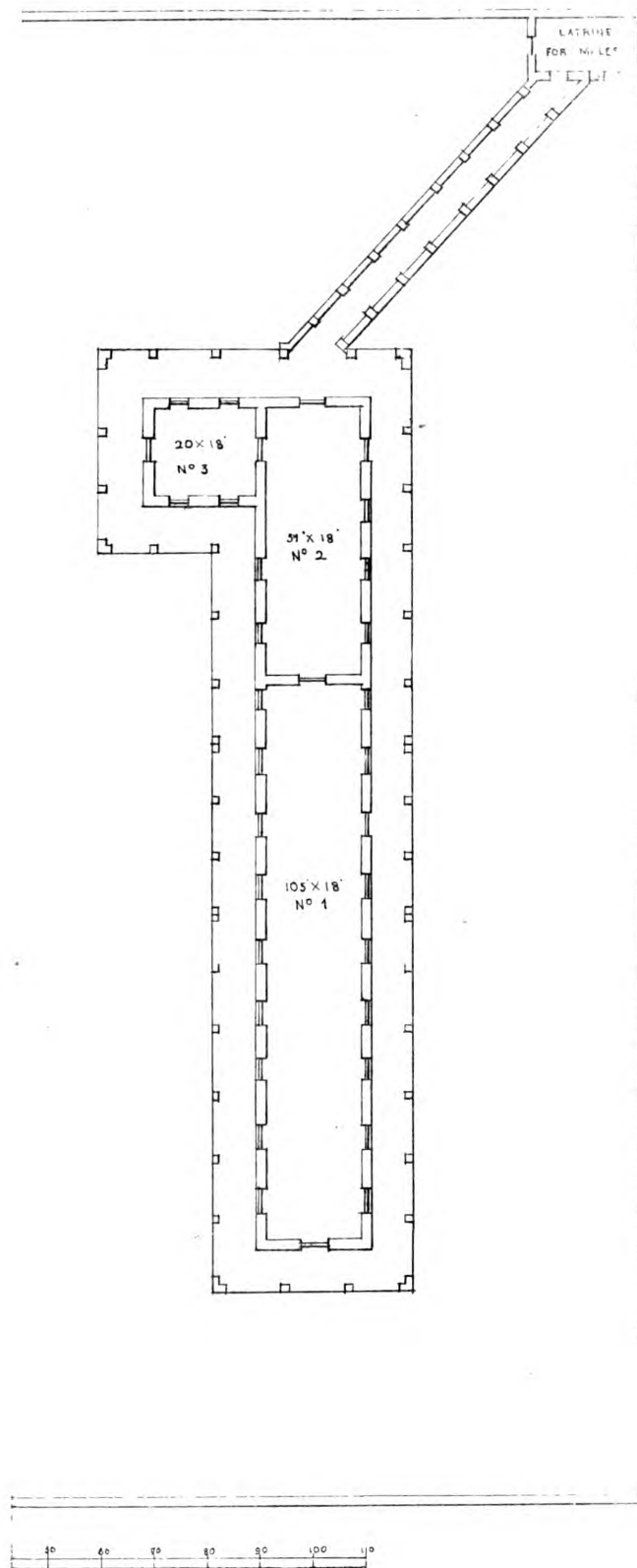
194. A general plan of this Hospital is appended hereto, and it will be seen that it affords accommodation in Wards which are now well-ventilated and airy for some sixty patients.

195. It is proposed that this building should be employed as a Garrison Hospital, and for this purpose, it is, in the opinion of this Commission, well suited.

196. Some minor alterations may be required to fit it for this use, but they will be neither numerous nor expensive, for almost all that could be done, has been already affected to improve the condition of the Hospital. During the earlier part of the year 1863, there was much unhealthiness in the 66th Regiment. The conservancy of the Hospital was indifferent, and it was surrounded by a high wall which prevented thorough ventilation. This wall has been since removed and with a most beneficial effect.

197. At the period of our inspection one Ward was considerably over-crowded, having 33 patients where only 19 should have been, if each was allowed 100 square feet superficial area. This over-crowding, however, was only temporary and resulted from the fact of one of the large Wards being under repair. The Hospital, generally, was exceedingly neatly kept, but the condition of the roof was unsatisfactory, as in some places it leaked a little,

PLAN
REGIMENT OF FOOT AT BANGALORE
CONVERTED INTO A GARRISON HOSPITAL



198. The Latrines are worked on the Dry Earth System and with great success, but coal
Latrines. tar was also used as an accessory deodorizer.

199. The Bath rooms in this, as indeed in all old European Hospitals, were exceedingly
Bathing Rooms. faulty. The rooms were small, insufficient in size
and number, and there were no pegs to hang clothes
or towels upon.

200. The Female Wards have been recently much improved, and the unpleasant smell
Female Wards. arising from the Latrines has been cut off by a par-
tition wall.

201. The accompanying statement of Accommodation and Plan shows the capacity and
arrangement of the different parts of this Hospital.

202. This Commission recommends to Government that this Hospital, when no longer
Recommendation. required for the Infantry, be converted into a
Garrison Hospital.

Detailed Statement of accommodation in

Rooms.	How occupied.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	Regulation No. at 1,000 Cubic.	Superficial area then afforded.	No. of Cots at present at each room.	No. at 100 superficial area.
		Length.	Breadth.	Height.						
		Ft.	Ft.	Ft.						
No. 1.	Venereal Ward.	105	18	10 $\frac{2}{3}$	1890	20160	20	94	33	19
No. 2.	Venereal "	33 $\frac{1}{2}$	18	10 $\frac{2}{3}$	603	6432	6	100	6	6
No. 3.	Female "	40	18	10 $\frac{2}{3}$	720	7680	8	90	4	7
No. 4.	Mixed "	105	18	10 $\frac{2}{3}$	1890	20160	20	94	*	19
No. 5.	Mixed "	51	18	10 $\frac{2}{3}$	918	9792	10	92	8	9
No. 6.	Mixed "	60	18	10 $\frac{2}{3}$	360	3840	4	90	4	3

Detailed Statement of accommodation in

Block No. 1.	1	European Male Ward.	36	20	14	720	10080	10	72	10	7
	2	Native Ward.	46	20	14	920	12880	13	70	15	9
	3	Surgery.	19	20	14	380	5320	5	76	....	....
	4	Office.	19	7	12	133	1596	1	133	....	....
	5	Guard Room.	9	6 $\frac{1}{2}$	12	58 $\frac{1}{2}$	702	....	....	....	....
	6	Separate Ward.	6 $\frac{1}{2}$	8	10	54	540	....	....	1	....
	7	European Latrine.	6 $\frac{1}{2}$	4 $\frac{1}{2}$	7	32	224	....	....	....	....
	8	Native Latrine.	11 $\frac{1}{2}$	9	7	106	740	....	....	....	....
	9	Cookroom.	10	8	8	80	640	....	....	....	....
	10	Female Latrine.	6	6	8	36	288	....	....	....	....
	11	Female Ward.	12	12	12	144	1728	2	72	2	1
	12	Female Ward.	12	12	12	144	1728	2	72	2	1
	13	Bathroom.	12	6 $\frac{1}{2}$	8	78	624	....	....	....	....
Total at 85 superficial.										18	

Detailed Statement of accommodation in

Block No. 1.	1	Centre Ward for European and East Indian Women.	21	18	16	378	6048	6	63	8	3
	2	Western side Ward do.	18	18	16	324	5184	5	65	6	3
	3	Eastern side Ward do.	18	18	16	324	5184	5	65	6	3
	4	Verandah.	15	8	10	120	1200	....	....	....	....
	5	Examination Room.	15	8	10	120	1200	....	....	....	....
Block No. 2.	6	Office Room.	10	10	10	100	1000	....	....	....	....
	1	Special Native Patients' Ward.	10	16	13	160	2080	2	80	4	1
	2	Native Patients' do.	40	16	13	640	8320	8	80	18	6
	3	Do. do. do.	40	16	13	640	8320	8	80	18	6
	4	Do. do. do.	40	16	13	640	8320	8	80	18	6
	5	Verandah.	130	6	10	780	7800	....	....	....	....

the Garrison Hospital of Bangalore.

the Lock Hospital of Bangalore.

2016	3	2	4	3	2	7	4	Open Verandah in front.
1728	3	2	4	3	1	7	4	
1728	3	3	4	3	1	7	4	
		2	{ 5 3 1	{ 3 2½ 2½	1	7	4	
		1	3	2½	1	7	4	
2080	2				1	6	3	Do. do.
1386	4	2	4½	3	1	6	3	
1366	4	2	4½	3	1	6	3	
1386	4	2	4½	3	1	6	3	

GARRISON HOSPITAL.

203. This Hospital consists of one large Native Ward and one Ward for European and East Indian patients.

Style of construction.

204. There are also separate Wards for female patients. These were unoccupied at the time of our inspection.

205. The accompanying Plan and Statement of accommodation show that the Native Ward is only capable of containing nine patients, the European Ward for males only seven, and that only two

Capacity of Hospital.

Unfit for continued occupation.

females can be accommodated in the detached building. The Hospital is so essentially bad, that it should be abandoned as soon as possible, and the patients transferred to the present Infantry Regimental Hospital when it becomes available for this purpose.

ing. The Hospital is so essentially bad, that it should be abandoned as soon as possible, and the patients transferred to the present Infantry Regimental Hospital when it becomes available for this purpose.

Latrines.

206. The Latrines of this Hospital are very ill constructed and should, if the Hospital be maintained, which seems doubtful, be reconstructed.

Separate Ward.

207. The separate Ward, if the small room 8 x 6 feet deserves the name of a Ward, is quite useless from its small size.

No Dead room.

208. There is no Dead room in this Hospital.

Water supply. The Water cart for the Lock Hospital and the water carrier for the Garrison Hospital have been disallowed, and the Hospital servants procure water from an adjacent well.

209. A nurse is only entertained if there are female patients in Hospital, and the result is the attendant who is hurriedly entertained is found frequently to be inefficient.

Female attendants.

210. At the period of our visit there were no women under treatment, and had there been, the accommodation provided for them was so exceedingly indifferent, that in all probability the patients would have been subjected to much discomfort.

211. I am induced thus forcibly to direct attention to the many faults in this Hospital as under certain circumstances the access to it of a large number of patients might occur.

212. All European recruits passing through the Station, drafts of Regiments, whether of Cavalry, Artillery or Infantry, European pensioners and their families, Invalid Soldiers of all classes, including men sent to this Station as a Sanitorium, Medical and Veterinary Pupils, Dhooly Bearers and all Garrison public servants, as well as all classes of followers, permanently or temporarily receiving pay from Government, are entitled to advice and treatment in this Hospital.

Persons entitled to treatment in Hospital.

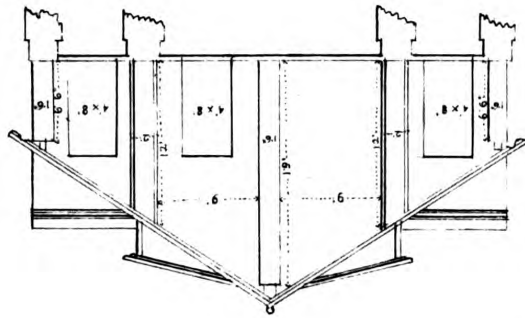
213. It will be seen by the tabular statement of accommodation that there is only superficial space sufficient for 7 European and 9 Native males, and that on the occasion of our visit 25 cots were placed in the two Wards affording this accommodation. If these cots were all occupied, the most dangerous over-crowding would necessarily have taken place.

214. Under such circumstances, this Commission recommend to Government that the continued use of this Hospital should be abandoned.

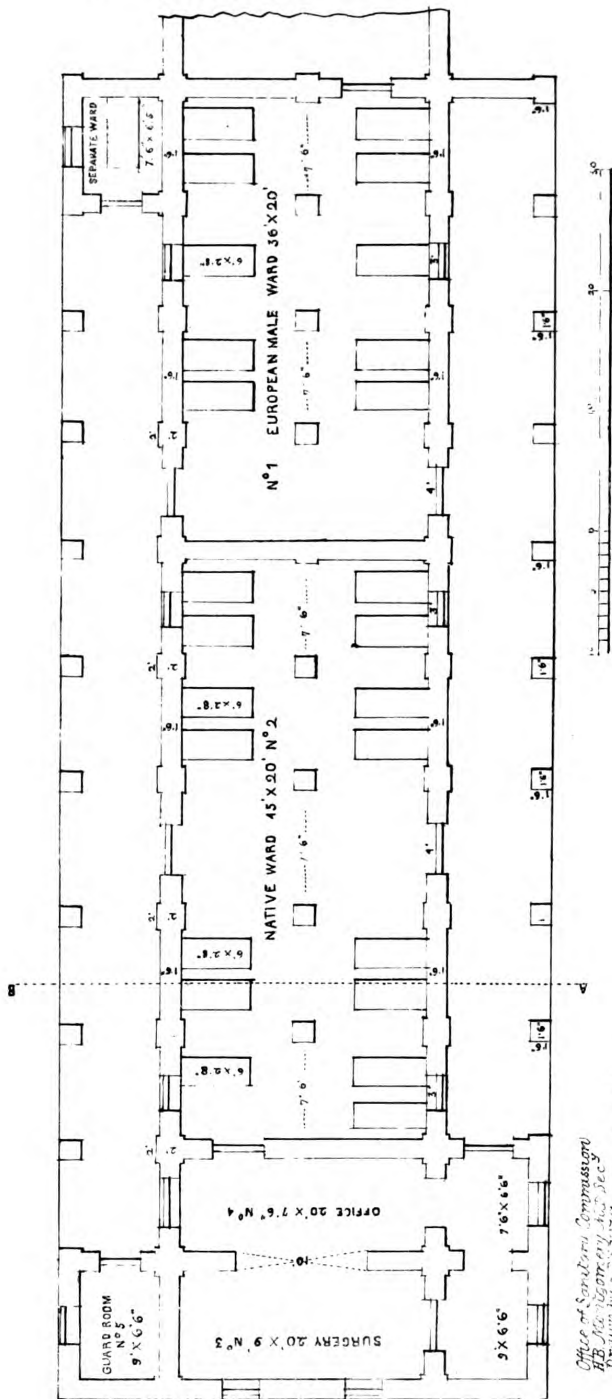
LOCK HOSPITAL.

215. The statement of accommodation of this Hospital shows that it comprises 3 Wards for European and Eurasian females. These apartments are lofty and well ventilated.

PLAN AND SECTION
OF
GARRISON HOSPITAL
AT
BANGALORE



SECTION TRANSVERSE A-B



Office of Sanitary Commission
HB Bangalore, 1st Dec.
Drawn by S. S. S. S.
Lithographed by R. Barron, April 1860

216. There are at the entrance to the building a small Office and Examination room and behind the Female European and Eurasian Wards, 4 Wards for Natives.

217. There is sufficient accommodation for 9 of the former class and for 19 of the latter, allowing 100 superficial square feet per patient. At the time of our inspection there was a good deal of over-crowding, there being in the Hospital 46 Native patients or more than twice the number which the wards should contain.

218. Two European women were also under treatment and the cots allotted to this class are never occupied fully.

219. The number of cots shown in the tabular statement is the number actually in the Wards and not the number occupied at the time of our inspection.

220. Beds are provided for the European and East Indian women and straw mats for the Native women except in severe cases when the native females are supplied with mattresses.

Cleanliness of Hospital. The Lock Hospital was throughout scrupulously clean.

221. The ground opposite the Latrine in the Hospital requires levelling and the drainage of the Hospital should, without delay, be attended to.

222. The women were wearing their own clothes, but I understand from Dr. Rogers, that Hospital clothing will shortly be issued to the inmates of the Lock Hospital.

223. I regret that my enquiry into the system observed for the registration and inspection of the Prostitutes who are frequented by the European soldiery, leads me to think that the Police, Control of Prostitution.

although there is a local regulation which gives them power to act, have failed in this portion of their duties.

224. The real number of Prostitutes frequented by European Soldiers is not entered in the Registers and those who are registered evade inspection.

This matter has been brought by me to the notice of the Chief Commissioner and of the officer who is at present at the head of the Town Police. I have little doubt that progress will soon be made in checking Venereal disease which is "the disease" of the Bangalore garrison.

225. This Commission trust that the Rules, prepared in connection with the new Military Cantonment Act, which relate to the prevention of venereal disease, will be applied in their entirety to the Bangalore Station.

LINES OF MADRAS SAPPERS AND MINERS.

226. These lines were formerly occupied by a Regiment of Native Cavalry, and are situated North West of the Ulsoor tank which is distant from the North East angle of the lines 200 yards, and 350 from South East angle.

227. The low level of this tank which is intended to supply drinking water to the European Barracks, and the importance of keeping the water free from impurities, render the drainage of these lines of considerable importance. The whole of the ground allotted to these lines forms a parallelogram lying N. E. and S. W. and N. W. and S. E. of the central point.

228. The lines lie along the S. W. side and are thus exposed to the Monsoon from this direction. The ground slopes gently down towards the Western Bay of the Ulsoor tank, and the Storm Water drainage must, like that of the surrounding lands, be directed towards this point.

229. As hereinafter noticed, the place selected for lines is bounded on one side by a public road (S. E.) and on the adjoining sides by public buildings and a bazaar, separated from it by a narrow

oad. To the first two of these boundaries there is no objection, but the lower portion of the lines

might be, with great advantage, relieved from the probable ill effects of the close proximity of a cluster of Native huts, which are crowded together at the Southern angle of the lines, and which must be a source of nuisance from their filthy condition and want of drainage and ventilation.

230. I would therefore recommend that these huts be at once removed.

231. As the bazaar of which these huts form a part is to the S. W. and close to the lower portion of the site chosen for the lines, the drainage of it was carefully examined and found to be defective. The drains are ill made and empty themselves on the eastern side into the Storm Water Drain, skirting the S. E. side of the whole lines. This drain empties itself ultimately in the water channels leading to the canals in the reclaimed land occupying the Western Bay of the Ulsoor tank. I would strongly recommend that all sewage drains should be diverted from it and that they should be directed if possible so as to join the main drain.

232. I believe that owing to the comparative levels of the bazaar and the bottom of the main drain, there will be no difficulty in doing this—and that the storm water channel of the latter may be crossed below under its bed by a masonry sewer which could join the main drain at right angles, but not to run into it. The junction of the two would, with the channel and side of the present sewage drain (parallel to the water channel), form a square cesspool which might be trapped with advantage—means being as now taken to flush out the main drain on the occasion of heavy rain. The storm water would continue as at present to be received in the larger channel and from it pass to the Ulsoor tank.

233. Before noticing the leading points requiring attention in housing the Sappers and Miners, I desire to draw attention to the block of buildings lying to the West of the hutting ground.

234. Here a large and confused assemblage of native houses exists between the lines and a public road (Pensioner's Hill.) Like most Native bazaars the houses are irregularly placed and ill-drained and offensive house water and refuse are allowed to trickle from wide openings in the walls next the lines into hardly formed drains so ill-made that stagnant pools of most offensive filth lying along this side of the Lines render the air impure and offensive. Unless a strict and complete system of conservancy is enforced among these people, it will be necessary for the health of the Sappers and Miners, that these huts should be removed, such compensation as may be necessary being paid to the owners.

235. I think that it is very desirable that advantage should be taken of the present opportunity to construct for the Sappers and Miners permanent Lines, in lieu of the indifferent huts usually occupied by Native Soldiers in this Presidency. It is unnecessary that I should dwell upon the vast superiority of the former in promoting and securing the health and comfort of the Soldier; and the Permanent Lines at Perambore (Madras) show satisfactorily that Cholera and other Epidemics fail to affect them as injuriously as they do other Native Lines in the vicinity of Native bazaars. Perfect conservancy is literally impossible in the Native Lines hitherto constructed. I believe this question of substituting Permanent Lines for the Native Troops instead of the present huts throughout the Presidency has been under the consideration of His Excellency the Commander-in-Chief.

236. It is a subject of great importance as affecting the health and comfort of the Native Army. Owing to the increased price of all articles of consumption, the pay of the Native Troops is not more than is absolutely necessary for their maintenance, and the expense which they incur whenever they change stations in paying for their lines far exceeds their Hutting money and falls very heavily upon them.

237. Moreover, they are obliged to incur a considerable annual expense in keeping their wretchedly constructed dwellings in repair.

238. The Corps of Sappers and Miners could themselves build the houses and construct the drains required for their lines and in a comparatively short time a model would be furnished upon which other similar Lines for Native Troops could be constructed, should it seem desirable to accommodate similarly other Regiments at such stations of this Presidency, as Madras, Secunderabad, Bellary, &c.

239. Inspector General Shaw, late Officiating Principal Inspector General, and indeed all Medical Officers of experience in this country, are of opinion that a material improvement in general health, a diminution of sickness and mortality—and a lessening of the spread of epidemic disease in the Native Army would result from the general adoption of permanent well built residences for Native Soldiers.

240. I now proceed to notice briefly the proposed method of utilizing the existing buildings on the proposed site of the Sappers' Lines for special purposes.

241. The Old Horse Lines are to be eventually made into European and Native Gardens ; for this purpose they are from their previous use especially suitable.

The Sheds formerly used as Sick Lines and for boiling gram are to be made into Artificers' Sheds, for which they are well suited. The old gram boiling Shed will make a good forge. Some of the Sheds will require to be closed in, but these and other minor details are necessarily omitted from this report, which is merely intended to embrace such remarks as may have direct influence upon the health of the men, both European and Native, belonging to the Corps.

242. One block of buildings to the North of the N. E. angle of the Lines, contains quarters for 2 Staff Serjeants (Quarter Master and Serjeant Major), and affords very sufficient accommodation. A good verandah in front gives protection from sun and rain, and a good Sitting room, Bed room, Bathing room and Pantry are allotted to each man. The front Verandah is divided and a good compound adjoins the outer side of each house. Should it be desired, a small portion in front might be neatly enclosed, so as to bring the compound up to the same frontage as the present Hospital building.

243. In noticing these quarters, I would call attention to the overcrowding which not unfrequently takes place in the married quarters assigned to Non-Commissioned officers, by their receiving into the rooms intended for one soldier and his family, numerous other relations such as brothers, sisters, aunts, and uncles. This is detrimental to the health of the inmates for whom these quarters are intended by Government, and an order limiting the occupancy of such quarters should be issued by the Military authorities and strictly enforced.

244. The rooms themselves in the quarters inspected, were all perfectly clean and neatly furnished and if devoted to their proper use would have afforded a most complete and comfortable home for a married Staff Serjeant. In the main building there was ridge ventilation and thorough ventilation from front to rear by opposite doors and windows.

245. Almost identical in point of design 4 pairs of semi-detached cottages are about to be erected for 8 married families. They are intended to face the road on the east of the upper ground and have the same accommodation as is found in the Staff Serjeants' Quarters, except that no Pantry is provided. The design of these buildings is good and suitable to the

class for whom they are intended. They are superior to the plan of Family Quarters in the Dragoon and new Race Course Barracks, but would, from the arrangement of the chief rooms along the frontage, occupy nearly double the same extent of front space as is required in the other Barracks, and as the same width must be carried in front for Gardens and behind to hold Cook-room and Privy a very considerable space of ground would be required for any number of them. In point of ventilation, however, they are decidedly superior. (vide Plan.)

246. As previously noted in my remarks on the other Barracks, the small compound in the rear was practically diminished in size by placing the Out Offices badly placed. Cook-room and Privy in a line running from front to rear along the party wall dividing the compounds of adjoining houses.

247. It is suggested that if possible the Privy and Cook-room should be placed in opposite angles of the back of this little piece of ground, By this slight alteration, the distance between the main building and out-houses is increased and this is highly desirable, as in the new Race Course Barracks not only is the Compound in the rear too small, but the outhouses are within 6 or 7 feet of the only Bed room window.

248. In the family quarters built in continuous blocks, the same arrangement should, I think, be adopted.

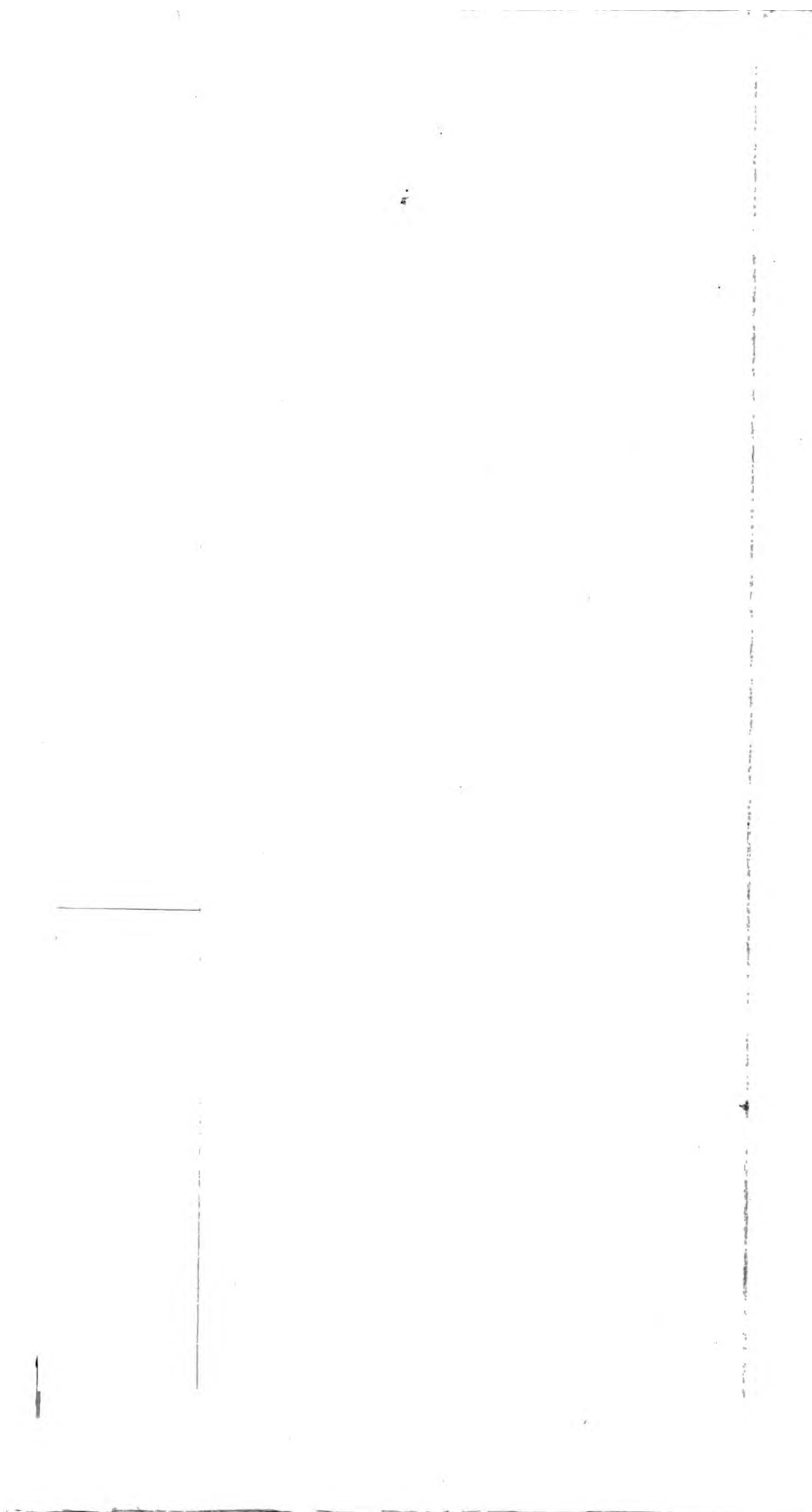
249. If no doors are provided in the rear wall of these compounds, I think a "shoot" might with advantage be placed adjoining each Cook-room to discharge house sweepings and kitchen refuse into an iron vessel placed outside, and which could be emptied once or twice a day by the scavengers' carts for whose easy access a good road in rear of all the houses is to be constructed.

250. Of the buildings devoted to general purposes, the Barrack Block requires notice as it is intended to convert it into quarters for unmarried Europeans and School rooms. Of the subsidiary buildings used as places of Arms, Main Guard, &c., &c., nothing need be said. They only require ordinary repairs and white-washing. The Guard room is on the standard plan and well ventilated. (Vide Plan.)

251. The Barrack block forms the rear of a quadrangle the left side of which it is proposed to convert into quarters for unmarried soldiers. To effect this the roof must be removed, the walls raised, the windows enlarged and the whole building improved as regards ventilation.

252. The corresponding building on the other side is to be used as a School house. If devoted to this purpose, it is certainly desirable that similar measures to those recommended for the family quarters should be adopted.

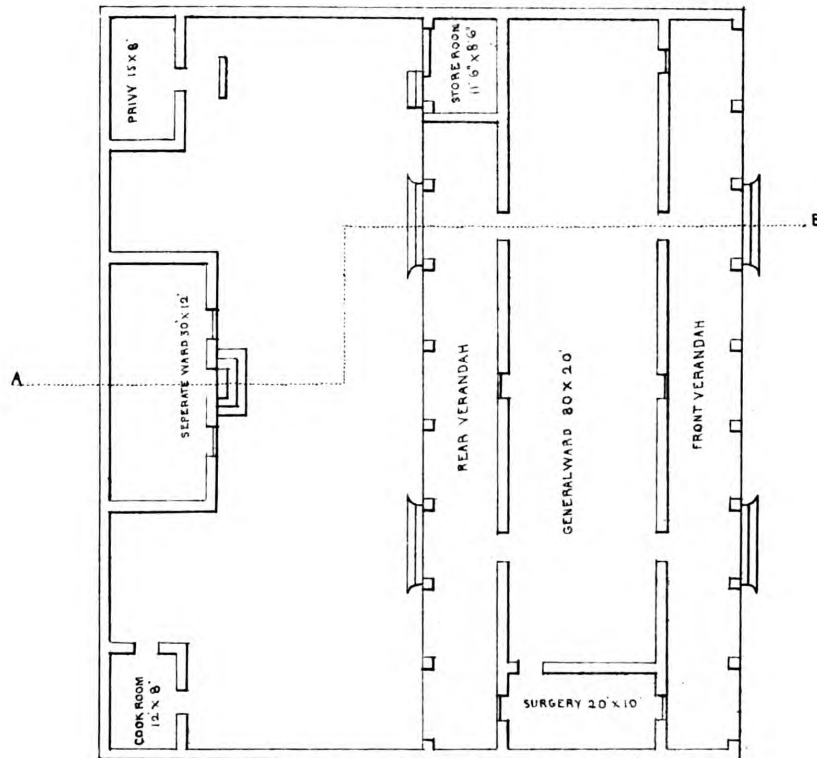
253. These two buildings are not large and should it appear to Government that it is desirable to provide for the Europeans of the Sappers who are all Non-commissioned Officers, a superior class of accommodation to that provided for common soldiers, it may perhaps seem advisable that both these buildings should be divided into quarters and allotted to these men. There are 24 Europeans in this Corps and not improbably others may arrive from England. If any considerable number of these are married, the 8 quarters now provided for married men will be insufficient.



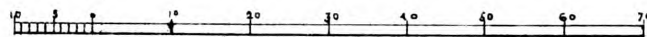
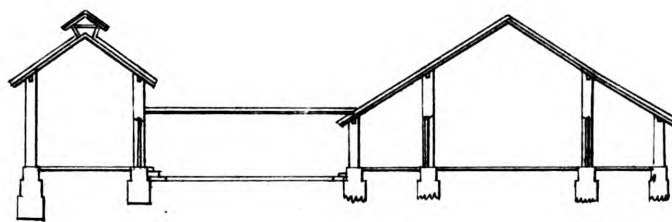




PLAN
OF THE HOSPITAL OCCUPIED BY THE MADRAS SAPPERS AND MINERS



SECTION THRO' A, B.



Office of Sanitary Commission
Drawn by E. D. Sotzka
Lithographed by A. Barron May 1865

Site for Detached School Room if required. 254. If this should necessitate the erection of separate School rooms, there is abundant space for them on the ground to the North of the Barrack Block. I urge these recommendations for consideration as it is now proposed to have the Hospital for Natives close to the quarters to be allotted to unmarried men and to build between these places a Recreation room for the latter.

255. The Hospital is in a very good situation so far as pure air and good position are concerned and in point of arrangement is fairly suited to the wants of a small Native Regiment. It consists of a long Ward 80 x 20 and with a small adjoining room intended as a Surgery. It has a verandah in front and rear. Part of the latter has been walled in as a Bath-room. A good separate Ward 12 x 30 is to the rear of it, and two out-buildings, suited for a Cook-room and Privy.

256. To secure fully the proper segregation of patients, the European Ward should be entirely distinct from the Native Hospital, and should be provided with Latrines and Washhouses of a special construction.

Requirements of Hospital if segregation is to be insured.

257. The only ground upon which such buildings could be erected is a space of ground between the present Native Hospital and the Quarters of the Staff Sergeants, and I do not consider that it is at all desirable that Hospital Buildings should be increased in this direction. The present separate Ward is hardly suitable for Europeans, as it lies between the Lines and (in the same enclosure with) the Native Hospital. Having considered carefully the relative position of all the foregoing buildings, I am of opinion that the requirements of the Regiment would be best met by (1) the conversion of the "Barrack Block" side buildings into sets of Quarters for 2 Europeans each, and (2) by the transfer of the Europeans of the Sappers and Miners to a General Military Hospital on the Race Course, if such an institution is sanctioned.

258. The Hospital, as it now stands, is provided with ridge ventilation which has however been blocked up with wooden weather boards. This is supposed to have been intentionally done as it was temporarily employed as a Brewery, but these obstructions can be easily removed. The separate ward is furnished with ridge ventilation and is well suited to this purpose for Natives. All the Hospital premises are exceedingly dirty and will require thorough cleansing before they can be used.

259. Should it be considered that a new Native Hospital should be built in conformity with the views of Col. Crommelin, (as modified by the Commission) then a good site is available for this purpose at the end of the old Horse Lines on high ground.

Site for new Hospital.

260. An Hospital constructed in this site would be well removed from all houses—would be to leeward during the S. W. Monsoon and would further allow that to windward of it and to the North of proposed School and Staff Sergeants' Quarters, additional accommodation could be provided for married Europeans, if they should be required. This could certainly not be done if the present Hospital is continued in its present use.

261. I should mention that a very indifferent private residence has been erected between the Hospital and the Sergeants' Quarters. It is in a dilapidated condition and should be at once removed; the site would be available for one pair of family quarters.

Private dwelling adjacent should be removed.

Adjoining private residence should be removed.

262. I understand that a Plunge Bath has been sanctioned for the use of the Europeans. I can only suggest that this should be placed in or close to the proposed Gardens where (as at a distance from all houses) the water could be utilized without any probability of harm.

Plunge Bath

263. In conclusion I desire to submit the following recommendations of this Commission.

- (1.) That the huts at the Southern angle be removed.
- (2.) That the Drainage of this place should be diverted from its present course.
- (3.) That the conservancy of the hutting ground be promoted by enforcing a complete system of conservancy in the Native Houses lying to the West of it.
- (4.) That permanent lines be erected by the Corps of Sappers and Miners.
- (5.) That here and elsewhere overcrowding of public quarters by private families should be strictly prevented.
- (6.) That the out-houses of the proposed family quarters should be thrown to the back of the enclosed compound and not be built contiguous.
- (7.) That the school-rooms should be improved as it is suggested the Barrack quarters are to be.
- (8.) That the Europeans of the Sappers and Miners be treated in a General Military Hospital at Bangalore if such an Institution is sanctioned.
- (9.) That the private dwelling house existing in these Lines should be at once removed.

LINES OF NATIVE INFANTRY REGIMENT.

264. The Lines of the three Native Infantry Regiments stationed at Bangalore are situated on the N. W. part of the Cantonment as shown in Map A. At the eastern extremity of this portion of ground the 14th Regt. N. I. is huttet, the 22nd Regiment was placed in the centre, and the 33rd at the western end. The lines of the latter Regiment are separated into two wings or divisions, between which a broad road leads down to the Railway Terminus.

265. The same style of huts is used by all the men, namely the ordinary mud hut with thatch roof. These huts are usually arranged in double rows back to back, and facing streets of different widths. The huts of the Native Officers are generally larger and better finished than those of the men; but in other respects closely resemble them. These huts vary in size from 15 to 12 feet square, according to the rank of the occupants and generally have from 5 to 6 persons living in each hut. This space is entirely insufficient for the number of persons who occupy the dwelling which has the further disadvantage of being generally very badly ventilated. Permanent lines of suitable design would greatly conduce to the health and comfort of the Sepoy, and this Commission is desirous to press this topic upon the notice of Government being aware that their views on this subject meet with the full concurrence of His Excellency the Commander-in-Chief.

266. As will be seen from the remarks resulting from our detailed inspection of these places, the conservancy of them is very defective although the position of the ground occupied by the lines at Bangalore is singularly favorable to the introduction of a regular system of drainage while the erection of Latrines to be kept strictly under Regimental supervision would promote the health and comfort of the Sepoys and their families.

Lines of 33rd.

Position and Drainage.

267. These lines are extremely well situated on the slope of the hill which affords a natural fall for the surface drainage.

Conservancy neglected.

268. This position is so far fortunate, for there is no attempt made to secure cleanliness by any thing deserving the name of a made drain.

269. There are imperfectly dug ditches on the side of the lines. For these should be substituted the granite slab drains common in Bangalore, where this stone is abundant and easily worked.

270. The Sepoys' huts are thatched instead of being tiled as they should be.

Faults in the huts.

271. They are constructed according to the Quarter Master General's standard. The huts present the usual defects of being dark, and the yard attached to each hut is much too small for huts inhabited by the Sepoys who have generally large families.

Sepoys pay for Conservancy Establishment. 272. The Lines were clean, but this cleanliness is obtained at the expense of the Sepoys who employ Scavengers to clean their lines, each Sepoy paying at the rate of one anna for each inmate of his hut, a further sum of 3 pie per house is paid for keeping the roads swept.

273. I do not think this charge should fall on the Sepoys, who at the present high prices prevailing are certainly not overpaid, but should be defrayed by the State.
Conservancy should be provided by Government.

274. The public Latrine of the 33rd Regiment was most offensive and dirty. I was unable clearly to ascertain who was responsible for the only part of the conservancy which is not paid by the Sepoys themselves. The Commissariat are supposed to supply the carts, and I conclude the Quarter Master of the Regiment is responsible that the work is done. The Latrine is liable to be flooded, and this Commission would recommend that a proper Latrine should be constructed for these Regimental Lines, and that Dry Earth Conservancy should be enforced. As the Sepoys already use the sewage of their houses in the Regimental gardens, there will be no difficulty in getting earth, and in employing the poudrette.

275. 223 of the sepoy's have small gardens remarkably well cultivated with vegetables. With assistance from their Officers they have sunk wells and take much pleasure in the cultivation of their gardens. These gardens are very creditable to the officers who have aided—and the men who work in them. Special credit is due to Dr. Henderson, for the active share he has taken in promoting this useful and healthy occupation of the sepoy's.
Sepoy's Gardens.

276. The School house which is nothing more than a rudely constructed shed—is not sufficiently large and is badly lighted.
School house.

277. There are on an average between 50 and 60 pupils, and at a slight expense, a decent school house might be constructed.

278. The education in the Telugu and Hindustani languages is elementary and is eagerly sought after.

279. The Quarters of the Regimental Serjeants of the 33rd Regiment are situated in close proximity to the Lines, and are surrounded by a wall which should be removed. If a light fence was substituted for this and the enclosure laid out as a garden, the comfort of these men and their families would be much promoted.
Regimental Serjeants' Quarters.

280. The Quarters themselves situated on the flank of the right wing are small in dimensions and badly constructed. If not capable of improvement, this Commission is of opinion that new and suitable quarters should be built for these men whose social position demands that they should be suitably housed.

281. The Guard-room is formed of two portions of the Verandah of the Barracks for Stand of Arms. It measures 20 × 9, and 30 × 9 or in all 450 square feet superficial area. It has one door, 3 windows on one side and two on the other, and seems sufficient for its intended use.
Guard room.

282. There are two Prison Cells on S. W. side of the General Parade Ground. Each Cell has 64 feet superficial area and 672 cubic space of air, and is ventilated by a barred opening 7 feet from the ground and measuring 6 feet long by 1 high. A sun shade protects the inmate from sun and rain. Running along the Cell and under the same roof is a passage 3 feet wide with a closet seat for the use of the Sepoy in confinement.
Prison Cells.

283. From a large bowry close to the Lines, from two wells adjoining them, and from the "Dhobies' Tank" about quarter mile distant, abundance of good water is procurable throughout the greater part of the year ; but in the hot weather the supply from these places frequently fails to a very considerable extent. The sinking of additional wells would therefore seem to be highly desirable.

284. It is understood that the Lines of the 14th when vacated by that Regiment, will not again be occupied by a Native Regiment, as two Regiments of Native Troops only will in future be stationed at Bangalore.

285. The site of these Lines has on several occasions proved unhealthy, probably on account of the ground being saturated with the accumulated dirt of the Sepoys for many years. It will therefore be of decided advantage to clear this ground and leave it vacant for a period.

286. Hereafter when the ground has been 'purified' by having the site of these Lines used as gardens—the site may be found valuable for building purposes.

287. The remarks recorded above regarding the Lines of the 33rd apply generally to the Lines of the 14th, the drainage is defective, the huts dark and the cost of conservancy falls entirely on the Sepoys of the Regiment. No regimental Latrine has been provided for these lines, the Sepoys make use of a drain situated where the Regimental bazaar meets the Bilah Halli (commonly called Blackpillay) bazaar as a Latrine or else have recourse to the Billah Halli Latrine one of the most offensive buildings of the kind I have yet seen.

288. Much has been recently done by the energetic Municipal Committee to improve this part of the station by piercing broad streets ; more improvements are in contemplation and are most urgently required.

289. In the lines of this Regiment a good deal of Fever was formerly prevalent and was referred by the Medical authorities to the presence of a number of dry wells which had become receptacles of dirt and offal. These wells were filled up and the disease disappeared. In all respects as connected with drainage, construction of huts, &c., these Lines closely resemble those of the 33rd Regiment.

290. There are 2 Solitary Cells situated at the South western end of the general Parade Ground used by this Regiment. In dimensions and ventilation these are identical with those noticed in the 33rd Regiment.

291. The Guard room of this Regiment is in every respect identical with the Regiment last noticed.

292. A mud building with tiled roof and divided into 2 rooms for Hindoos and Mussulmen, and with a court yard in front of sufficient size affords accommodation for the children of the Regiment. The average attendance is said to be about 35 of Hindoos and about 30 of the Mussulmen children.

293. Drinking water is furnished from a large bowry close to the Lines. It is good and plentiful throughout the whole year, water for bathing purposes is derived from 4 bowries within the limits of the Lines themselves. This Commission is of opinion that the water used for drinking should be analyzed, and if this be found not

Architectural floor plan of a hospital ward building. The plan shows a central 'LARGE WARD 82' X 20' N° 1' flanked by 'VERANDAH' areas. At the top are 'SMALL WARD 20' X 8' N° 3', 'SURGERY 27' X 10' N° 2', and 'MEDICAL STORE ROOM 8' 9" X 7' 6"'. At the bottom is a 'HOSPITAL STORE ROOM 20' X 10"'. Various rooms and corridors are numbered, and dimensions are provided for several areas.

A technical drawing of a door frame. It shows a cross-section of the frame with a diagonal brace on the left side and a vertical support on the right side. The drawing is labeled with '1' and '2'.



Office of Sanitary Commission
H. B. Montgomery, M.D., Sec'y
Drawing on transfer paper by F. D. Soward
Lithographed by A. Everett, New York

satisfactory, filtering beds should be placed round these wells as has been done with such marked good effect at the well close to the Old Dragoon Barracks.

294. On the East of the Lines, a ground measuring about six cawnies has been given up as Sepoys' Gardens. Sepoys' gardens and about 16 per cent. of the men cultivate vegetables in them. They were neat, well laid out, and men of different castes are found not only willing but anxious to employ their leisure time in this healthful amusement.

295. The same observations apply to the Lines occupied by the 22nd Regiment. In these, however, the ventilation is much impeded by cross blocks of houses opposite some of the main streets. Lines of the 22nd Regiment.

These ought to be removed and regular drains should be constructed in all these lines.

296. Having before advocated the erection of permanent Lines for the Sappers and Miners at this Station, this Commission would urge a similar recommendation as regards the two Native Infantry Regiments who will continue to be stationed at Bangalore.

297. The Guard rooms and Solitary Cells of this Regiment are strictly identical with those of the 14th and 33rd Regiments. Guard Room and Solitary cells of 22nd Regt.

298. A large bowry on the neighbourhood yields drinking water of satisfactory quality and 2 wells within the limits of the Lines themselves supply additional water for other domestic purposes. Water supply.

299. Much less interest appears to be taken in this Regiment in the places allotted as Sepoys' gardens. A smaller number of men work in them and the gardens themselves are not as neat or well kept as those of other Regiments. Sepoys' Gardens.

300. There are certain subsidiary buildings connected with these Native Regiments which require passing notice.

331. The Bells of Arms of the 14th and 33rd Regiments call for no remark, except as regards the privies, which are faultily constructed and badly kept. Subsidiary Buildings.

302. The outside of the powder magazine of the 22nd Regiment is used as a Urinal and is very offensive. As Bells of Arms are necessarily almost in a public highway, immediate attention is required to this defect which has been brought to the notice of the Deputy Inspector General and will be speedily remedied. Owing to some mis-apprehension of orders on the subject, the Sepoys resort to a nullah in the middle of the Parade Ground at a considerable distance from the Bells of Arms and use it as a Latrine. They were evidently under the impression that they were obeying orders and seemed rather proud of their readiness to comply with the supposed wishes of the Military authorities, though they complained of the distance of the nullah.

HOSPITALS OF NATIVE INFANTRY REGIMENTS.

303. The accompanying Plan of the Hospital of the 33rd Regiment and the statement of Hospital accommodation of the three Regiments will give all necessary information regarding these buildings.

304. These Hospitals consist of a number of rooms, the larger being a general Ward for sick, and the other rooms being devoted to the purposes indicated in the second column of the tabular statement appended. Style of construction of Hospital of Native Infantry.

305. The general design of all the Native Regimental Hospitals at this station is identical with that of all the older public buildings erected for this purpose, and has on the whole been found to answer satisfactorily owing to the small numbers usually in Hospital. Uniform style in the three Hospitals.

Detailed Statement of accommodation in the Hospitals of Regiments of Native Infantry at Bangalore.

Block and Rooms.	How Occupied.	DIMENSIONS.			Superficial area of each room.	Cubic contents of each room.	Regulation No. at 1,000 cubic feet.	Superficial area then afforded.	No. of cots at present in each room.	No. at 100 superficial area.	Cubic contents thus afforded.	Openings for Ventilation.	WINDOWS.			DOORS.			REMARKS.
		Length.	Breadth.	Height.									Number.	Height.	Width.	Number.	Height.	Width.	
1	General Ward	85	20½	14	1742	24395	24	72	20	17	1435	4	8	5½	4	2	6½	4½	• Wall enclosing the Court yard.
	Surgery	19	20	14	380	5320	..	..	..	..	..	..	5	5½	4½	2	6½	4	+The Cook room and latrine are situated on the North-East end of the Court yard, the latrine has 3 divisions or compartments, the cook room is divided from it by a wall.
	Special Ward	9	7	14	63	882	..	..	1	..	882	..	1	5½	4½	1	6½	4	
	Special Ward	18	12	14	216	3024	3	72	4	2	1512	..	2	5½	4½	2	6½	4	
	Store Room	17	11½	14	195	2737	..	..	..	..	..	..	1	5½	4½	1	6	3½	
	Court Yard*	54	18½	9½	999	9240	..	..	..	..	..	..	..	..	..	..	..	..	
	1 Cook Room†	8½	6½	9	53	482	..	..	..	..	..	1	1	2½	2	1	5	3	
1 Latrine	8	6½	9½	50	462	..	..	..	..	..	1	1	2½	2	1	5	3		
1	General Ward	85	10	18	1016	1616	25	64	22	16	1616	3	7	4	5	3	4	5	Open Verandahs on both sides with pillars
	Surgery	8	18	10	150	2410	..	..	..	..	..	..	2	4	5	3	4	1	
	Cook Room	8	2	10	89	87	784	..	..	..	..	1	1	2	7	2	2	1	
	Latrine	8	2	10	89	87	784	..	..	..	..	1	1	2	7	2	2	1	
	Court Yard	70	4	18	66	1301	..	..	..	..	..	..	..	..	..	..	1	6	
1	General Ward	88	10	19	711	1739	20	87	24	17	1202	3	6	4	2	3	2	6	Some space is taken up by eight pillars in the centre H. 15.9
	Surgery and Store Room	27	10	11	6	270	3105	..	..	..	..	Small openings.	5	4	2	3	2	6	B. 1-10.
	Small Ward	19	6	10	10	6	2047	2	97½	2	97½	In the ridge.	2	2	4	2	3	2	Of irregular shape, and partially divided into two, by a wall.
	Cook House	14	9	7	117	9	116	905	..	..	..	1	1	2	5	2	2	1	
	Privy	14	9	7	117	9	116	905	..	..	..	1	1	2	5	2	2	1	
	Verandahs (2) open	88	10	8	2	9	725	6529	..	..	..	..	..	..	..	..	..	..	Closed in the day time by Purlahs.

306. A long Ward capable of containing from 14 to 20 patients constitutes the main building, and at the end of this are one or more rooms devoted to reception of special cases, Bathing rooms, Surgery, &c.

Description of Wards and rooms.

307. The chief Ward is usually sufficiently wide to allow of free passage between the ends of the beds and, as dining tables are not required, any width from 18 to 20 feet is ample—although wider rooms would perhaps be preferable, yet the increase of cost arising from any serious enlargement of this kind prevents me from recommending any greater change in this respect in any Hospitals to be hereafter designed, than that the Wards be made 22 feet wide, (vide Appendix F.)

Width of Wards.

308. But in all these Hospitals at Bangalore much space is lost and complete supervision is prevented by the existence of a large number of heavy masonry pillars supporting the ridge pole of the roof and impeding the centre of the Wards very materially.

Central Pillars objectionable.

309. I think these pillars ought to be removed and either that iron pillars should be substituted for them, or that cross beams should be placed at the height of the side walls, and these made a means of support for the ridge pole according to the plan to be seen in so many churches and other lofty apartments, &c.

How to dispense with them.

310. The Medical Officers of the several Regiments all urged strongly the desirability of these pillars being removed, as they impede light and ventilation, and reduce the ground space which would otherwise be available. In this recommendation Acting Inspector General Mackenzie and Deputy Inspector General Balfour concur.

311. I need scarcely say that these Hospitals are entirely at variance with the recommendations contained in Colonel Crommelin's Memorandum, but until the decision of Government is received as to whether or not an improved style of construction is to be adopted and an increased amount of accommodation afforded, it would be premature to do more than to direct attention that they do not afford sufficient accommodation at the standard of space considered necessary for native patients.

Hospital at variance with Colonel Crommelin's plans.

312. As will be seen from the foregoing remarks and from the tabular statements appended, all these Hospitals held, at the time of our inspection, a number of patients considerably in excess of that which would be allowed when 100 square feet is definitely fixed as the minimum of superficial area to be allowed to sick Sepoys at Bangalore. If therefore the recommendation to this effect made by this Commission receives the sanction of Government, then it would become necessary very considerably to enlarge these buildings, even if their entire re-construction is not considered essentially necessary.

Overcrowding in all Native Infantry Hospitals.

313. These Hospitals although constructed on the old principle of Native Regimental Hospitals, have been improved by the introduction of roof ventilation not continuous, and they have further ventilation by doors and windows.

314. In the Hospital of the 33rd Regiment there is a small separate Ward at one end of the long Ward, this is likely to be noisy as a much frequented road runs by this end of the Hospital.

Separate Ward Hospital of 33rd Regiment.

315. At the other extremity of the Ward is a well lighted Dispensary and office room.

Dispensary and Office.

316. The cots in the Hospital are the old wooden cots which the Sepoys prefer as they use their own bedding to the cleaner and more sanitary iron cots. The objection of the Sepoys would be met by providing mattresses as well as cots to Native Regimental Hospitals.

Cots.

317. The deficiencies in this Hospital are—that
 Requirements of the Hospital. there are no quarters for the Apothecary, and no Bath
 room for sick men who require special ablution. There is also no Dead house.

318. The privy though clean was offensive in odour from its construction. The Dry
 Privy. Earth conservancy could at any time be introduced
 into this Hospital and this reform should not be
 delayed.

319. The provision of quarters for the Medical Subordinate is an urgent necessity, for
 Want of quarters for Medical Subordinates. a severe case of Cholera may seriously suffer from the
 loss of time required to give notice thereof to the
 Medical Subordinate whose house is at some distance from the Hospital. This deficiency is
 general in all Native Regimental Hospitals, and should be remedied throughout the Military
 stations of this Presidency.

320. Supposing the Lines of the 14th Regiment to be removed, the present Hospital of
 the 14th should be made over to the 22nd Regiment, and the Hospital of that Regiment be com-
 verted into quarters for the subordinate Medical officers of the 22nd and 33rd Regiments N. I

321. The Hospital of the 22nd Regiment is so deficient in the essentials of a good Hospital,
 Hospital of the 22nd Regiment. that I am sure it is only necessary to point these out to
 Government to secure the carrying out of the
 arrangement mentioned in last paragraph.

322. The Main Ward is barely 19 feet wide and is not only obstructed by central pillars,
 Main Ward. but a good deal of it is given as an office room, there
 No special or separate Wards. being no office in the building. This is the only Ward
 for the treatment of sick. No separate or special Wards
 are to be found, and of both of these there is considerable want ; and, the Dispensary Room is so
 dark that the issue of medicines is positively attended with considerable risk.

223. On the occasion of our visit a case of Varicella was under treatment in this Ward.
 Cases of this description should invariably be treated outside the body of the Hospital.

224. The Hospital of the 14th Madras Native Infantry very much resembles in point of
 Hospital of 14th M. N. I. construction that of the 33rd Regiment ; but is superior
 to it with respect to accommodation. There is no doubt
 that the transfer of the sick of the 22nd to this superior building will be decidedly conducive to
 the more effectual treatment of their diseases and to the prevention of those serious results which
 might follow if epidemic disease be introduced into an Hospital totally unprovided with separate
 accommodation for this class of cases. This Hospital can in one special Ward accommodate 2
 patients, while the other is scarcely sufficient for occupation by even one person. The use of this
 latter special Ward and the Store room might be exchanged, as the Store room is sufficiently
 large for one person. In the Hospital of the 14th, the cots were all of wood and of a most in-
 ferior description. The legs of these cots were rickety and insecure. Close to the Hospital of
 the 14th is a dangerous nullah, likely to cause accidents at night and convenient for the com-
 mission of nuisances. This nullah should be filled up and the drain at its head prolonged.

225. In conclusion I have to submit the following recommendations by this Commission :—

- (1.) That permanent Lines be erected for 2 Corps of Native Infantry at Bangalore.
- (2.) That all charges of conservancy in the Lines should be defrayed by Government.
- (3.) That the Regimental or public Latrines used by Sepoys should be re-constructed
 and worked on the dry earth principle.
- (4.) That the quarters of the Regimental Serjeant of the 33rd Native Infantry should be
 improved or that new quarters should be erected.
- (5.) That additional wells should be sunk for the use of the 33rd and 14th Regiments.
- (6.) That the present Lines of the 22nd Regiment should be put under cultivation.

- (7.) That the present Hospital of the 14th Regiment should be handed over to the 22nd.
- (8.) That the ventilation of the Lines of the 22nd should be improved by the removal of all cross blocks opposite the main streets.
- (9.) That the Latrines attached to the Bells of Arms of the 33rd and 14th Regiments, be improved.
- (10.) That Government should decide whether new Hospitals should be built for these Regiments in accordance with the views of Colonel Crommelin as modified by this Commission.
- (11.) That if the present Hospitals are to be retained, the heavy masonry pillars be removed from the centre of the Wards and that sufficient accommodation be provided for 40 men in general and special Wards to afford for each man 100 square feet superficial area.
- (12.) That the Hospital of the 22nd Regiment be converted into quarters for the Medical Subordinates of the 33rd and 14th Regiments.
- (13.) That for each of the Hospitals of these two Regiments, a Dead House and strictly separate Ward be erected, detached from the body of the Hospital.
- (14.) That the nullah close to the Hospital of the 14th Regiment should be filled up or a covered water channel substituted for it.

HEALTH OF THE TROOPS IN GARRISON.

326. I cannot conclude this report without directing the attention of Government to the state of health of the Troops in Garrison, both Europeans and Natives. An examination as to the number in each force in Hospital showed that preventible disease was present to an alarming extent. Venereal disease may be said almost to fill the European Hospitals of this Cantonment as may be seen from the following brief statement. In the Regiment of the 18th Hussars only just arrived, there were 8 cases of this kind out of 34 sick in Hospital. In the 66th Regiment which has been in the station for some time 35 cases were in Hospital out of a total of 66 sick, and several of these had been in Hospital for periods varying from 1 day to 4 months; but of all cases longest in Hospital 9 were due to the same disease. In the A Battery 14th Brigade of Royal Artillery of a total of 9 sick, 5 were suffering under Venereal disease. In the D Brigade Royal Artillery of 16 sick, 7 were being treated for same disease. And, in the Inspection report of the Hospital of the King's Dragoon Guards, I have already reported to Government, that of the 25 cases in Hospital in the month of September, no less than 12 were attributable to the same cause. I alluded in my remarks on the Lock Hospital at this station to the very imperfect supervision exercised over public women in Bangalore—not one-third of the public prostitutes being registered; but even under this imperfect system, 48 women were under treatment and throughout the year 1864, an average of 45½ women were constantly under treatment for this disease.

327. Subsequent to the inspection of the Lock Hospital, a Meeting was convened by me to discuss the subject of the control of Prostitutes. At this meeting the Deputy Inspector General, Mysore Division, the Deputy Inspector General Her Majesty's British Troops, and the several Medical Officers of the different European Corps in Garrison were present. Dr. Rogers the Surgeon of the Lock Hospital, and Captain Cole, Superintendent of Police, also attended. I discussed with these Gentlemen, very fully the best measures to be adopted to control prostitution, and to render the working of Lock Hospitals efficient; and it was the unanimous opinion of those present that, if the Rules proposed to be adopted when the Military Cantonment Act comes into force can be introduced in the Bangalore Station, they would probably be found sufficient to effect a considerable diminution in the prevalence of Venereal disease.

328. I may further state on this subject that the following tables will shew that of the women summoned by the Police, little more than one-half usually attended for examination at the Hospital.

Imperfections of the present system,

Opinion of Medical authorities on proposed system of control of Prostitutes.

329. The following returns compiled by Dr. Farquhar are of interest on this point.

They indicate the extreme prevalence of disease among the prostitutes brought for Examination, only a small proportion of them, about 25 per cent. as will be observed, being found "free from disease."

1864.	1	2			3	4	5
	Total No. re-quired from Police Register.	Number Examined.			Total examined.	Found Diseased.	Clean or free from Disease.
		A. Total No. sent up.	B. Came of their own accord.	C. Sent up from former lists.			
January.....	78	33	5	18	56	41	15
February.....	79	35	2	12	49	39	10
March.....	82	43	2	11	56	48	8
April.....	92	44	0	16	60	47	13
May.....	70	39	2	11	52	41	11
June.....	65	23	0	16	39	28	11
July.....	58	41	2	21	64	48	16
August.....	74	46	1	14	61	38	23
September.....	60	35	2	7	44	34	10
October.....	48	18	3	67	88	49	39
November.....	32	20	4	10	34	25	9
December.....	41	27	3	0	30	27	3
Total...	779	404	26	203	633	465	168

330. Nothing can more clearly than the foregoing show the necessity of frequent examinations at stated intervals and of compulsory attendance of all public women at the Hospital for this purpose ; for it has been shown above that of all the women examined at the Hospital, 75 per cent were found to be diseased.

331. I trust that the facts detailed above may induce the early adoption of active measures in this respect. Although this disease is so prevalent among Europeans, yet the accompanying returns will shew that it is comparatively rare among Natives. In 3 Regiments, numbering altogether 2,173 men who would be treated in Hospital, only one case of Syphilis was under treatment at the time of my visit. It must be remembered that the majority of the Native Soldiers are married.

Sick Report of Regiments of Native Infantry at Bangalore, 31st October 1865.

Names.	Rank.	Diseases.	Date of Admission.	REMARKS.
14th Regiment M. N. I.				
Shaik Homed.....	Private	Febris Intermit	26th October 1864.	
Davood.....	do.	Rheumat : act :	21st do. do.	
Fakeer Homed.....	do.	Febris Intermit	26th do. do.	
Koormiah.....	do.	Ulcer	27th do. do.	
Shaik Hoossain.....	do.	Ophthalmia	28th do. do.	
Yenkadoo.....	do.	Febris Intermit	29th do. do.	
Abdul Curreem.....	do.	do.	29th do. do.	
Syed Moodeen.....	Naigue	Hepatitis	30th do. do.	
Chinsawmy.....	Havildar	Phlegmon	31st do. do.	

Names.	Rank.	Diseases.	Date of Admission.	REMARKS.
22nd Regiment.				
J. Johnson.....	Drummer..	Rheumat : chron:..	10th October 1864.	
Sunnasee.....	do. ..	do. ..	12th do. do.	
Rungasawmy.....	Havildar ..	Febris Intermit ..	20th do. do.	
Coomarasawmy.....	Private ..	Rheumat chron: ..	23rd do. do.	
Nizamooddeen.....	do. ..	Ulcus ..	23rd do. do.	
Byragee.....	do. ..	Vesiculæ—pedis ..	25th do. do.	
Venketsawmy.....	do. ..	Febris Intermit ..	25th do. do.	
J. Manuel.....	Drummer..	Vulnus Incisum ..	25th do. do.	
Hyder Khan.....	Private ..	Phlegmon ..	26th do. do.	
Shaik Cawder.....	do. ..	Rheumat chron: ..	26th do. do.	
Veerunnah.....	do. ..	do. ..	27th do. do.	
Paupiah.....	do. ..	Ulcus ..	27th do. do.	
Yenkiah.....	do. ..	Rheumat chron: ..	27th do. do.	
Kistnamah.....	do. ..	Febris Intermit ..	28th do. do.	
Ibrahim.....	do. ..	Scabies ..	29th do. do.	
Syed Yacoob.....	do. ..	Febris Intermit ..	29th do. do.	
Mahomed Kaja.....	do. ..	do. ..	31st do. do.	
Syed Sillar.....	do. ..	Ulcus ..	31st do. do.	
33rd Regiment N. I.				
Jaffer Khan.....	Private ..	Syph: Secund ..	30th August 1864.	
Ramasawmy.....	do. ..	Rheumat chron: ..	12th Sept. do.	
Sawmy.....	do. ..	Rheumat : ..	17th do. do.	
Pooliah.....	do. ..	do. ..	18th October do.	
Ramasawmy.....	do. ..	Ulcus ..	19th do. do.	
Gopaulsawmy.....	do. ..	Abscessus ..	25th do. do.	
Mahomed Cassim.....	do. ..	Febris Intermit ..	28th do. do.	

As regards the health of both European and Native Troops, generally, it was satisfactory. The following brief statement of the numbers in Hospital will show the percentage of sick in each arm of the service.

FORCE.	Strength of men who would be treated in Hospital.	Actual Sick.	Percentage of Sick to Strength.
EUROPEANS.			
D Brigade R. H. Artillery.....	165	5	3.03
A Battery 14th Brigade.....	148	8	5.40
A „ 23rd „	114	10	8.77
18th Hussars.....	353	36	10.19
66th Regiment.....	752	61	8.11
NATIVE TROOPS.			
14th Regiment M. N. I.....	726	11	1.37
22nd „ „	741	21	2.83
23rd „ „	707	8	1.13

332. The remarkably small number present in the Hospitals of the Native Infantry is no doubt chiefly due to the small amount of Syphilis witnessed among them.

CAMPING GROUNDS.

333. It remains to notice the camping grounds of this station which have not yet been fixed upon.

334. One camping ground is required for Regiments arriving by Railroad en route to other stations, and Cholera Camps should be selected for the removal of the Regiments either entirely or in divisions on the occasion of epidemic disease making its appearance in the station of Bangalore. The ground chosen is at a distance of about $\frac{3}{4}$ of a mile from the Railway station on what is known as the High ground. The spot is very well situated for this purpose, being free from jungle—on high ground with a gentle slope which will secure its being dry.

335. There is good water in close vicinity to the ground, there are no bazaars or native villages in the neighbourhood and it is connected with the Railway station by a good road.

336. If the exact spot pointed out to me by the Deputy Inspector General, Dr. Mackenzie, be selected, I would suggest that the Mussulman burial ground which has been recently opened should be closed as its close neighbourhood to the camping ground might eventually prove objectionable.

337. It may perhaps be also an objection that this camping ground is close to the lands which have been laid out as building sites for the New Town which will shortly spring up near the Railway, and if the Commissioner should consider this objection of weight he might be requested to select for the camping ground another site somewhat further removed from the building sites. There will be no difficulty in doing this as there is an abundance of ground eligible for this purpose in this neighbourhood.

338. No time should, I think, be lost in selecting Cholera camps in the neighbourhood of the Bangalore station. There should, I think, be 4 in number and within a distance of five or six miles of the station.

339. The Deputy Inspector General, Dr. Mackenzie, pointed several places well suited for this purpose and there will be no difficulty in arranging with the Commissioner to secure the necessary land.

340. I have mentioned 4 Cholera camps because in the case of any epidemic prevailing in the Cantonment, it will be well that each of the European Regiments, the Artillery Horse Brigade and Foot Artillery and the Native Infantry should have a place ready for Cholera camps.

341. I trust that the General Commanding the division will be pleased to have these points decided and the sites of the Camps marked out with as little delay as possible.

342. Before concluding these remarks on the Barracks and Hospitals of Europeans, this Commission is anxious to suggest the propriety of instituting some place of public recreation and amusement for the European Soldiers at this station.

EUROPEAN SOLDIERS' CLUB.

343. It has been proposed to establish a Soldiers' Club at Bangalore. A similar club has been already established at Secunderabad with the greatest possible good to the Soldiers.

344. A building at the Eastern extremity of the Parade Ground lately used as a Commissariat godown is available for this purpose and has been placed at the disposal of the Soldiers' Club Committee.

345. The alterations required to make this building in all respects complete, are estimated to cost about 13,000 Rs. Should the Madras Government approve of the establishment of the Soldiers' Club at Bangalore, and be prepared to contribute funds for this object, the Chief Commissioner has intimated that a grant of funds will also be made by the Mysore Government.

346. At Dum Dum the Government of India purchased the building known as the Onbram Institute for a Soldiers' Club, at a cost of 25,000 Rs., and at Home the Government aided a similar Institution at Chatham to the extent of £2,000.

347. There can be no doubt that a comfortable Soldiers' Club at Bangalore would have a most beneficial effect in replacing the dissipation indulged in by the Soldiers in the bazaars by healthy recreation, and in so far that it will greatly conduce to the preservation of the health of the British Troops stationed at Bangalore.

348. In conclusion I have to solicit that the Orders of Government may be passed regarding the following recommendations made by this Commission.

NEW BARRACKS ON THE RACE COURSE.

(1) That 85 square feet superficial area should be adopted as the fixed regulation standard for Europeans in Barracks at Bangalore.

(2) That three new Barrack Blocks be constructed or such number as may be required to accommodate at this standard, one Regiment of European Cavalry and two Batteries of Artillery, if it is finally decided that this force should be placed on the Race Course.

(3) That a system of Drainage by open V shaped Granite channels should be constructed for these Barracks.

(4) That all Latrines and Urinals should be worked exclusively on the Dry Earth system as proposed by this Commission.

(5) That in all Barracks the men occupying any sleeping room should employ the adjacent closed Verandahs as Day and Dining Rooms and that the lighting of Barracks be improved.

(6) That the Canteen should be improved as suggested in paras. 59 to 61.

(7) That in the construction of all future Latrines and Urinals the style of building proposed by this Commission should be adopted.

(8) That all Cook-rooms should be provided with Duff's or Grant's cooking ranges, a suitable supply of culinary articles, tables for cutting and preparing meat.

(9) That additional workshops should be built.

(10) That permanent Stabling should be provided for all horses.

(11) That future family quarters should be made to measure 16 x 14 and 14 x 10 in two rooms with verandahs front and rear.

(12) That family quarters should have the Cook-room and Privy separated.

(13) That suitable Latrine and Urinal accommodation should be attached to all schools.

(14) That a General Hospital should be erected on the Race Course for all European soldiers in Bangalore.

(15) That a Plunge Bath be erected on the Race course.

(16) That the native village close to the Northern Corner of the Race Course should be removed, and that the making of Bratties, &c., and all other offensive occupations, as those of Butchers, Tanners, &c., should be interdicted in the vicinity of these Barracks.

OLD DRAGOON BARRACKS.

(1) That at the standard of 85 square feet only 48 men exclusive of Serjeants be accommodated in each of the old Dragoon Barracks.

(2) That the additional Barrack accommodation needed for a full Infantry Regiment be provided by the erection of additional Barracks.

(3) That each Barrack be sub-divided into 3 compartments as shown in plan, and that the better lighting of the Barracks be enforced.

(4) That suitable Latrine accommodation be provided for the families of married Serjeants in Barracks.

(5) That the Lavatories and Urinals for men be cleaned separately, and that dry earth conservancy be adopted in both Urinals and Latrines.

- (6.) That the Wash-houses be improved so as to secure more privacy to persons bathing.
- (7.) That the two blocks of family quarters now existing between the end of the Barracks and the public road be removed, and a low wall be erected as a Barrack enclosure.
- (8.) That the furniture of the Guard room be improved so as to promote the comfort of the men on duty, and that the Privy attached to the Guard room be adapted to the dry earth system.
- (9.) That a General Military Prison be built at Bangalore.
- (10.) That Wash-houses be built for women close to each block of family quarters.
- (11.) That the proposed new water-supply for these Barracks should be as soon as possible effected.
- (12.) That the Beds and Bedding be improved as recommended by this Commission.
- (13.) That the Hospitals for Males and Females be no longer used for this purpose, and that they be converted into Recreation and School rooms for the European Infantry Regiment.
- (14.) That the sick be treated in one General European Hospital to be erected on the Race Course.

BARRACKS AND HOSPITALS OF THE HORSE AND FOOT ARTILLERY

- (1.) That the standard of 85 square feet superficial area should be adopted for all men, exclusive of Serjeants, to be accommodated in the Barracks.
- (2.) That additional Barrack accommodation should be provided at the same rate for such men as may require it—the number to be thus provided for to be fixed by the Military authorities.
- (3.) That the drainage of the Barrack Blocks and especially of the Serjeants' quarters therein, should be at once improved.
- (4.) That all saddlery and harness should be as soon as possible removed from Barrack-rooms or Verandahs, and that suitable apartments for the safe custody of these should be provided either in detached buildings or in the stables recommended by this Commission, should these latter be approved by Government.
- (5.) That the beds and bedding should be improved as recommended in Appendix H of this Report.
- (6.) That the present Lavatories be removed and suitable ones erected, each to contain, in separate rooms, fixed baths and basins respectively.
- (7.) That new Cook-rooms and Privies be erected, that they both be well ventilated, and that the latter be so constructed as to be worked strictly on the Dry Earth principle.
- (8.) That the present Hospitals for Artillery when no longer required for their present use, be converted into Recreation rooms and Workshops.
- (9.) That suitable stabling be erected for all Horses.
- (10.) That new and improved School rooms be erected in closer proximity to the married quarters.
- (11.) That a good Plunge Bath be constructed.

MAIN GUARD.

- 349. That two privies should be re-constructed and worked carefully on the dry earth system.

BARRACKS FORMERLY OCCUPIED BY INFANTRY REGIMENT.

- (1.) That these Barracks be converted into Arsenal and Commissariat Stores.
- (2.) That the Hospital when no longer required by the Infantry Regiment be converted into a Garrison Hospital.

GARRISON HOSPITAL.

350. That this building be abandoned.

LINE OF THE SAPPERS AND MINERS.

- (1.) That the huts at the Southern angle be removed.
- (2.) That the drainage of this place should be diverted from its present course.
- (3.) That the conservancy of the hutting ground be promoted by enforcing a complete system of conservancy in the native houses lying to the West of it.
- (4.) That permanent lines be erected by the Corps of Sappers and Miners.
- (5.) That here and elsewhere overcrowding of public quarters by private families should be strictly prevented.
- (6.) That the out-houses of the proposed family quarters should be thrown to the back of the enclosed compound and not be built contiguous.
- (7.) That the school rooms should be improved as it is suggested the Barrack quarters are to be.
- (8.) That the Europeans of the Sappers and Miners be treated in a General Military Hospital at Bangalore if such an Institution is sanctioned.
- (9.) That the private dwelling house existing in these Lines should be at once removed.

LINE OF NATIVE INFANTRY REGIMENTS.

- (1.) That permanent Lines be erected for 2 Corps of Native Infantry at Bangalore.
- (2.) That all charges of conservancy in the Lines be defrayed by Government.
- (3.) That the Regimental or public Latrines used by Sepoys should be re-constructed and worked on the dry earth principle.
- (4.) That the quarters of the Regimental Serjeant of the 33rd Native Infantry should be improved or that new quarters should be erected.
- (5.) That additional wells should be sunk for the use of the 33rd and 14th Regiments.
- (6.) That the present lines of the 22nd Regiment should be put under cultivation.
- (7.) That the present Hospital of the 14th Regiment should be handed over to the 22nd.
- (8.) That the ventilation of the Lines of the 22nd should be improved by the removal of all cross blocks opposite the main streets.
- (9.) That the Latrines attached to the Bells of Arms of the 33rd and 14th Regiments be improved.
- (10.) That Government should decide whether new Hospitals should be built for these Regiments in accordance with the views of Colonel Crommelin as modified by this Commission.
- (11.) That if the present Hospitals are to be retained, the heavy masonry pillars be removed from the centres of the Wards and that sufficient accommodation be provided for 40 men in general and special Wards, each man to be allowed 100 square feet superficial area.

(12.) That the Hospital of the 22nd Regiment be converted into quarters for the Medical subordinates of the 33rd and 14th Regiments.

(13.) That for each of the Hospitals of these two Regiments a Dead House and strictly separate Ward be erected detached from the body of the Hospital.

(14.) That the Nullah close to the Hospital of the 14th Regiment should be filled up, or a covered water channel substituted for it.

HEALTH OF THE TROOPS.

351. That preventive measures be adopted to check the spread of venereal disease.

CAMPING GROUND.

That 4 Cholera camps be selected from 5 to 6 miles from Bangalore, and in different directions.

That a good site for ordinary camp for marching Troops be selected well removed from bazaars and private dwellings.

EUROPEAN SOLDIERS' CLUB.

That a Club for European Soldiers be founded at Bangalore.

R. S. ELLIS,

President, Sanitary Commission.

APPENDIX A.

I.—Table showing the Monthly and Yearly Mean Reading of the Barometer.			II—Table showing the Average Maximum Temperature for every Month and Quarter, as well as for the Periods, October to March, and April to September, with the difference between hottest and coldest Months and Seasons and Mean Maximum Temperature for the Year.				
Month.	1 Year 1859.		Month.	1 Year 1859.	Winter, Spring, Summer, Autumn.	Oct. to March. April to Sept.	
	Inches.			°			°
January.....	27.33		January.....	79	81	82	
February.....	27.28		February.....	83			
March.....	27.26		March.....	88	88	85	
April.....	27.22		April.....	86			
May.....	27.12		May.....	91	83		
June.....	27.06		June.....	84			
July.....	27.03		July.....	84	81		
August.....	27.07		August.....	81			
September.....	27.08		September.....	82	81		
October.....	27.13		October.....	82			
November.....	27.12		November.....	79			
December.....	27.17		December.....	80			
Means.....	27.15		Difference between				
			Hottest and Coldest Months.	Hottest and Coldest Seasons.	12	7	3
			Mean for year.....		83		
			Highest in.....		May.		
			Lowest in.....		January.		

III—Table showing the Average Minimum Temperature for every Month and Quarter, as well as for the Periods, October to March, and April to September, with the difference between the hottest and coldest Months and Seasons and Minimum Temperature for the Year.				IV—Table showing the Average Daily Range for every Month and Quarter, as well as for the Periods, October to March, and April to Sept., with the difference between the greatest and least months, and the Mean Daily Range for the year.			
Month.	1 Year 1859.	Winter Spring, Summer, Autumn.	Oct. to March. April to Sept.	Month.	1 Year 1859.	Winter, Spring, Summer, Autumn.	Oct. to March. April to Sept.
	°	°	°		°	°	°
January.....	59	61	65	January.....	20	19	17
February.....	63			February.....	20		
March.....	70	71	70	March.....	18	17	15
April.....	71			April.....	15		
May.....	72	69		May.....	19	14	
June.....	69			June.....	15		
July.....	70	69		July.....	14	12	
August.....	69			August.....	12		
September.....	70	69		September.....	12		
October.....	69			October.....	13		
November.....	67			November.....	12		
December.....	62			December.....	18		
Difference between				Difference between			
Hottest and Coldest Months.	Hottest and Coldest Seasons.	13	5	Hottest and Coldest Months.	Hottest and Coldest Seasons.	8	2
Mean for year ...		67		Mean for year.		16	
Highest in ..		May.		Greatest in....		January and February.	
Lowest in ...		January.		Least in.....		August, September and November.	

V.—Table showing the Average Temperature of the air for every Month and Quarter, as for the Periods, October to March, and April to September, and the difference between the hottest and coldest Months and Seasons, and Mean Temperature for the year.

Month.	1 Year 1835.	Winter, Spring, Summer, Autumn.	Oct. to March. April to Sept.
January.....	70	71	72
February.....	73		
March.....	79		
April.....	79	79	76
May.....	78		
June.....	75		
July.....	74	74	72
August.....	73		
September.....	74		
October.....	71	72	
November.....	71		
December.....	69		
Difference between			
Hottest and Coldest Months	10	8	4
Mean for year...	74		
Hottest in	March and April.		
Coldest in	December.		

VI.—Table showing the Average Temperature of the air for every Month and Quarter, as well as for the Periods, October to March, and April to September, and the difference between the hottest and coldest Months and Seasons, and Mean Temperature for the year.

Month.	1 Year 1859.	Winter, Spring, Summer, Autumn.	Oct. to March. April to Sept.
January.....	69	71	73
February.....	73		
March.....	79		
April.....	79	80	78
May.....	82		
June.....	77		
July.....	77	76	
August.....	75		
September.....	76		
October.....	75	75	
November.....	73		
December.....	71		
Difference between			
Hottest and Coldest Months	13	9	5
Mean for Year.	76		
Hottest in.....	May.		
Coldest in.....	January.		

VII.—Table showing the Monthly, Quarterly, Half-yearly and Yearly falls of Rain.

Month.	1 Year 1859.	Winter, Spring, Summer, Autumn.	October to March.
	Inches.	Inches.	Inches.
February.....	0.0	0.1	4.1
March.....	0.0		
April.....	0.0		
May.....	1.3	5.1	20.9
June.....	3.8		
July.....	1.6		
August.....	5.6	12.6	
September.....	5.4		
October.....	3.2		
November.....	1.1	7.2	
December.....	2.9		
	0.1		
Year... ..	25.0	...	...

NOTE.—These tables are extracted for easy reference from those contained in Mr. Glaisher's "Report upon the Meteorology of India in relation to the health of the Troops there stationed," as contained in Vol. 2 of the Report of the Royal Commission on the Sanitary State of the Army in India.

R. S. E.

APPENDIX B.

Tabular Statement of the results of Analysis of the following Drinking Waters received from the Deputy Inspector General of Hospitals, Mysore Division, Bangalore.

No.	Locality.	Sensible properties.		Chemical Properties.										REMARKS.							
		Appearance.	Odour.	Taste.	Reaction to test paper.	Solid ingredients in one imperial gallon			Hardness to soap test.		Chlorides determine as Chloride of Sodium in one imperial gallon.	Bases in solution by Carbonic Acid.			In solution after boiling.						
						Organic.	Inorganic.	Total.	* Temporary.	Permanent.		Total.	Iron.			Lime.	Magnesia.	Lime.	Magnesia.	Chlorides.	Sulphates.	Nitrates.
1	Ulsoor Tank, Bangalore.....	Opaque from suspended impurities...		Slightly earthy.	Faintly acid..	5	19.5	24.5	1°	4°	5°	Gs. 5.5537	A good deal ...	Traces	Average..	Small quantity.	A little above average.	Small quantity.	Average.	None detected.	
2	Dragon Well, Bangalore.....	Clear.....		None ...	Neutral	3.2	17	20.2	2.5°	10.5°	13°	Gs. 9.3536	Traces...	Average.	In small quantity.	A little above average.	Small quantity.	Average.	Average.		
3	Ulsoor Well, Bangalore.....	Opaque.....		None ...	Faintly acid..	4.3	15.1	19.4	1°	5.5°	6.5°	Gs. 5.846	Above average.	Average.	In small quantity.	A little above average.	Small quantity.	Average.	Average.		
4	Gentlemen's Well, Bangalore.....	Clear, a few floating particles.....		None ...	Faintly acid..	4.6	13.4	18	4°	9°	13°	Gs. 12.2766	Traces...	Average.	In small quantity.	A little above average.	Above average.	Average.	Average.		

* Each degree of temporary hardness equals 0.727 gs. Carbonate of Lime... } in one gallon.
Do. permanent do. 0.989 gs. Sulphate of Lime.. }

MADRAS, }
28th September 1861.

(Signed) S. J. WYNDOWE, M.D.,
Chemical Examiner.

APPENDIX C.

Statement shewing details of established strength of each Arm of Service of the Madras Army.

	European Non-Commissioned Rank and File.									Native Commissioned, Non-Commissioned Rank & File.									
	Staff Sergeants.	Sergeants.	Corporals.	Bombardiers.	Farmers.	Trumpeters or Drummers.	Artificers.	Gunners or Privates.	Drivers.	Total.	Subadars.	Jemadars.	Havildars.	Trumpeters or Drummers.	Farmers.	Naigues.	Privates.	Veterinary Pupils.	Total.
Battery Royal Horse Artillery.....	2	6	6	6	1	2	4	76	42	145	...	...	...	...	...	...	...	...	...
Battery Native Horse Artillery...	2	3	...	...	...	...	...	...	...	5	1	2	8	2	3	7	84	1	108
Regiment European Cavalry.....	18	21	28	...	7	8	...	434	...	516	...	...	...	...	...	...	...	...	...
Regiment Native Cavalry.....	2	...	...	...	...	...	...	...	...	2	6	6	31	7	13	24	300	2	389
Field Battery Royal Artillery.....	2	6	6	6	1	2	4	76	42	145	...	...	...	...	...	...	...	...	...
Garrison Battery Royal Artillery...	1	4	4	4	...	2	...	60	...	75	...	...	...	...	...	...	...	...	...
Battery Native Artillery.....	...	...	...	...	...	...	...	...	...	2	2	8	2	...	8	92	...	...	114
Corps of Sappers and Miners.....	2	20	40	...	...	...	...	...	...	62	10	10	43	20	...	84	1144	...	1311
Regiment European Infantry.....	9	40	40	...	...	21	...	810	...	920	...	...	...	...	...	...	...	...	...
Regiment Native Infantry.....	2	...	...	...	...	...	...	...	...	2	8	8	41	16	...	40	600	...	713
One Troop European Cavalry.....	...	4	4	...	1	1	...	62	...	72	...	...	...	...	...	...	...	...	...
One Troop Native Cavalry.....	...	...	...	...	...	...	...	...	...	...	...	5	1	2	4	50	...	...	62
One Company Sappers & Miners.....	...	2	4	...	...	...	...	...	...	6	...	4	2	...	8	105	...	...	119
One Company European Infantry....	...	4	4	...	...	2	...	81	...	91	...	...	...	...	...	...	...	...	...
One Company Native Infantry.....	...	...	...	...	...	...	...	...	...	...	...	5	2	...	5	75	...	...	87

APPENDIX D.

Statement shewing the composition of strength of each Arm of the Service of the Madras Army.

Description.	Europeans.	Natives.	REMARKS.
Battery Royal Horse Artillery.	145	..	
Battery Native Horse Artillery.....	2	111	
Regiment European Cavalry.....	516	..	Has 7 Troops present in India.
Regiment Native Cavalry.....	2	389	Has 6 Troops.
Field Battery Royal Artillery.....	145	..	
Garrison Battery Royal Artillery.....	75	..	
Battery Native Artillery.....	...	114	
Corps of Sappers and Miners.....	62	1311	Has 10 Companies.
Regiment European Infantry.....	920	..	Has 10 Companies present in India.
Regiment Native Infantry.....	2	713	Has 8 Companies.
One Troop European Cavalry.....	72	..	
One Troop Native Cavalry.....	...	62	
One Company Sappers and Miners.	6	119	
One Company European Infantry.....	91	..	
One Company Native Infantry.....	..	87	

QUARTER MASTER GENERAL'S OFFICE,
FORT SAINT GEORGE,
30th March 1865.

(Signed) F. H. SCOTT, Lieut.-Colonel,
Quarter Master General.

APPENDIX E.

OFFICE OF SANITARY COMMISSION,
MADRAS, 28th February, 1865.

No. 531.

From

HONORABLE R. S. ELLIS, C.B.,
President, Sanitary Commission,
Madras.

To

LIEUTENANT-COLONEL F. H. SCOTT,
Quarter Master General of the Army,
Fort Saint George.

SIR,

Enclosures 3.
Design for a New Hospital at Bangalore.
Appendix A.
Appendix B.

Proposed Hospital at Bangalore.

am now in a position to report, in detail, upon the plans submitted with your letter above referred to.

2. I may premise that during my visit to Bangalore, I carefully inspected the site proposed to be occupied by the New Hospital and that it is suitable and of sufficient area to contain a large Hospital in Pavilions for European Cavalry and Artillery and their families. This site has been approved by His Excellency the Commander-in-Chief in lieu of one previously selected.

3. In the Report of the Committee on the proposed Hospital this site is alluded to as being "one of the most elevated plateaus at Bangalore and as affording that isolation which is so necessary for a Hospital."

4. Before commenting on the plans now under notice I may direct attention to the fact that there is considerable discrepancy between the recommendations of the Committee and the designs prepared by the Public Works Department, and I think it right to add, that the report alluded to was, as may be seen from its date (1863), drawn up at a time when the Members of the Committee could not have had access to the numerous authorities now available to guide them in their suggestion.

As before stated by me, the "general style of construction proposed is good and a great improvement upon any existing Hospital in the Presidency." I trust therefore that any suggestions afforded by the Commission may be considered as simply intended to make the Hospital more perfect and as in no way reflecting on the judgment of the Members of the Committee or the Public Works Department.

Separate blocks of wards.

5. I now proceed to notice in detail the several suggestions of the Committee and the plans designed more or less in accordance with them.

6. It was proposed that there should be two blocks or pavilions, each block to be well raised and to form a "*separate and complete Hospital in itself*." From an examination of the plans, I infer, that by the words just quoted is meant separate and distinct wards for the accommodation of the sick of the two Corps named, for the administrative apartments were proposed to be put in Supplementary buildings—(vide para. 12 of Report.)

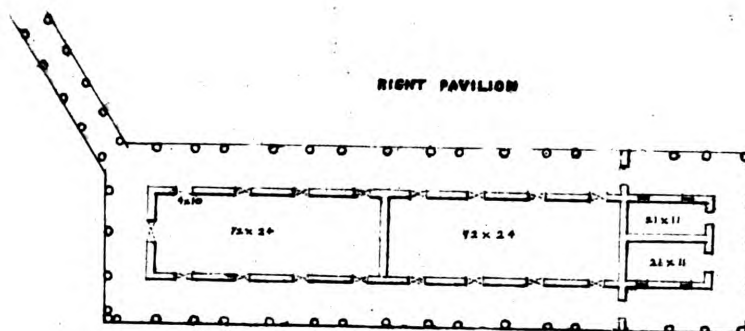
7. Each pavilion was to contain two wards on each floor, each ward to hold 16 patients—there would thus be accommodation for 128 patients in the two pavilions constituting the great body of the Hospital. To this proposition there can be no objection, but I would point out that each ward measuring 72×24 would only afford 108 square feet to each patient, and though this is amply sufficient, yet it is less than that proposed by the Committee, (viz., 112 square feet.)

8. The plan drawn shows double verandahs which are objectionable both in consequence of their cost, and because the enclosed inner verandah must be expected to interfere with thorough ventilation. I would suggest in correction of this, which was not the intention of the Committee (vide P.S. of their 1st Report) that these divided minor verandahs should be altered into a single open verandah 10 feet in depth.

9. This would of course necessitate a re-arrangement of the end room now shown in the plan and intended to hold two patients each. These wards were designed for "cases requiring separation" from which I infer that both non-contagious and contagious special cases were intended, as no other provision is made for sick requiring isolation.

10. I may remark that to place a patient labouring under Cholera, Small-pox or other contagious fever in rooms opening out into a passage affording access to a common ward, would be highly undesirable and that all such cases as those referred to should be treated in buildings situated at some distance from the main wards of the Hospital. I have therefore in a later portion of this Report (vide para. 33) to submit proposals for this class of sick and having done so have only here to suggest that the corner room now shown should be omitted at the inner end of each pavilion and at the outer end that they should be joined, the intervening passage being removed, and that they should be completely separated from the common wards as shown in the accompanying plan. If distinct separate wards are erected, then two special wards on each floor affording accommodation for 8 sick in each pavilion, would be ample provision for the intended object, namely, special non-contagious cases.

11. The relative position of the different apartments in each pavilion, the single verandahs and connecting colonnades are shewn below :—



12. A comparison of the plan above with the original design will show that I have thought it desirable to diminish very much the dimensions proposed in the latter, for I find on examining the plan that for each of the two separate cases proposed to be accommodated in each room 162 square feet superficial area was proposed to be given. I believe it will be found by experience that the use of these wards will be chiefly restricted to the accommodation of the superior Non-Commissioned Officers, cases of insanity, delirium tremens, or serious accidents or operations, and they will very seldom be fully occupied, but even if they were so 120 square feet superficial area would be abundant space for each of the two patients, while if one patient alone occupied the ward he would have double that space.

13. As shown in the original plan the "Special wards" had only a single verandah, although the rest of the Hospital is designed with double verandahs. This arrangement was of course necessitated by the large dimensions allotted to these special apartments; but if a single verandah is considered sufficient for the most important class of cases, it would surely be found equally suitable to wards intended for ordinary sick. I would suggest therefore that all the wards of the Hospital should be surrounded with a 10-foot verandah and that such portion of it as immediately surrounds the "special wards" should be devoted specially to the use of the patients inhabiting them.

14. In order also to prevent unnecessary disturbance from patients passing to the Latrines and wash-houses (who according to the plan would have to pass close outside the special wards) and also with the object of approximating the out-buildings and giving them a central position easy of access to all patients, the privies and wash-house should be placed directly in rear of, and much closer to, the centre of the back verandah. To the Lavatory direct access might be had from the verandah itself while the Latrine should be approached by a totally distinct passage. This arrangement is indicated in outline on the accompanying block plan by this Commission (vide para. 31).

15. If suitable arrangements are made for thoroughly draining the Lavatory and for speedily removing to a distance all water which is foul; and if the Latrine be worked by the Dry Earth system proposed by this Commission and not by the Punjaub system proposed in the plan, these out-offices need not be a source of the slightest inconvenience to the patients, while their comfort would be much more attended to than by the present plan where the most distant door of one of the general wards, from which a patient might enter the verandah is nearly 300 feet from the Privy.

16. I may also allude to the fact that for the upper stories no Latrine accommodation in the same floor is provided. As will be seen from the accompanying copy of letter relative to the General Hospital, Madras, there is not, in the opinion of this Commission, any objection either to the proximity of Latrines carefully worked with dry sifted earth, and if these be on both stories there would be less necessity for special utensils being provided in wards and verandahs for the use of patients laboring under bowel complaint or in a weakly condition.

17. Each Latrine for two wards should contain not less than 6 seats and should have a dry earth reservoir receptacle for poudrette and the other appliances noted in the letter above referred to from the Secretary to this Commission. A urinal should also be placed in the Latrine and another in the Bath-room.

18. The main wards should have the dividing wall closed entirely and there should be doors to close the openings from the wards to the verandahs in the main wards, and windows and doors in the special wards. Above each door a glazed swing attic should be placed to promote upper ventilation. The dimensions of the doors should be $8\frac{1}{2} \times 5$ feet, the doors to be of moveable venetians to 3 feet from the ground, the upper portion glazed, &c., with panes to open on hinges as recommended in paragraph 5 of the appended Report.

Details of construction of wards.
Doors.

Ventilation attics.

19. The doors and attics specified in the last paras. will, from their sheltered position, afford free ingress of air in all states of the weather, for even if excessive rain or very strong winds prevailed the doors and attic windows on one side of the ward could be left open. Egress of heated air and products of respiration should be promoted by flue ventilators springing from the surface of the ceiling opposite to the centre of each of the three middle piers on either side of the main wards, and from thence passing up through the walls of the upper ward. The upper wards should be similarly ventilated by flues with cowl heads or the flues of both stories might be fitted with Muirs' Patent Ventilator described and delineated at page 70 of the Report of the Commissioners for the improvement of Barracks and Hospitals. I consider this mode of ventilation preferable to that proposed by the Committee for the upper floor, namely, sky-lights, as the patent ventilator is constant in action and is free from control by patients.

Ventilation, details of.

20. In the Report and Plans under examination provision is made for the following detached quarters. In one building (No. 6 F.) on the upper floor there are a very large Operation room and three small apartments for Medical Officer. The ground floor of this consists of a Receiving room, Surgery and Dispensary for the Cavalry and Artillery respectively.

Supplementary building.

21. I am inclined to question the necessity of such very large accommodation as that afforded by this lower floor. No one corps of the ordinary strength of those proposed to be here accommodated would require more than a small Dispensary and small Receiving room. But the proposed rooms can be utilized as suitable for day use as Office and Committee Room, &c., for which no provision has been made.

22. If the question of the institution of a General Military Hospital for all European Soldiers at Bangalore had been favorably entertained, a considerable economy in these buildings might have been effected if one common Receiving room and Dispensary had been made for all corps.

Economy of space practicable in these respects in a General Hospital.

23. As however distinct accommodation for Regiments seems to be desired by His Excellency the Commander-in-Chief, I confine my suggestions to the best means of carrying out the necessary arrangements to secure the desired end, viz., separate accommodation for the sick of two corps.

24. In the plan now under examination there are, I think, several arrangements that could be amended with advantage. The Operation room is not suitably lighted; it is of quite unnecessary dimensions $55 \times 27\frac{1}{2} = 1512$ square feet. The windows are small and in the shade of a sloped verandah $10\frac{1}{2}$ feet deep and no light from above is provided.

Objections to upper floor of (Plan F.) Administrative rooms.

Faults in Operation room.

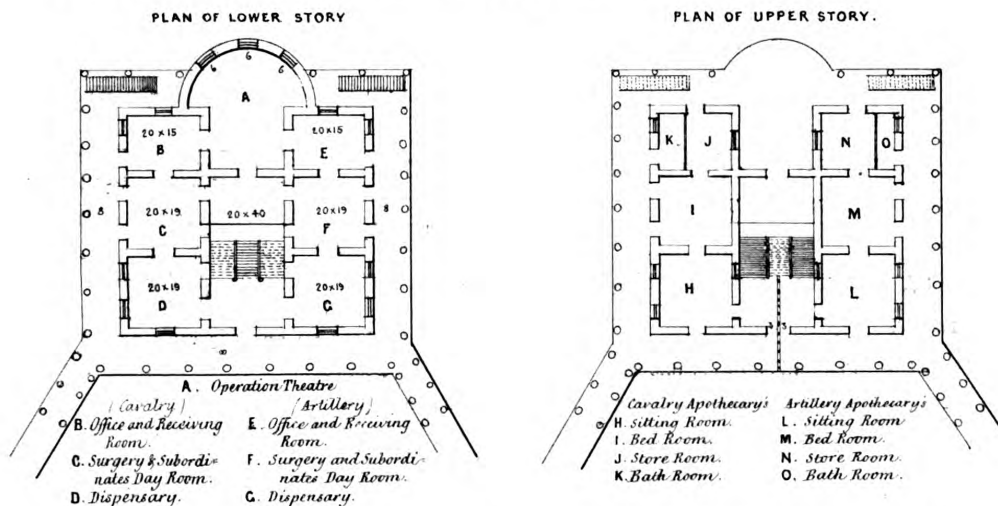
Suggestions.

Apothecary's Quarters.

25. The Operation room should not be on the upper floor but on the ground for obvious reasons, and the Apothecary should be resident in the same house in which is situated the Dispensary which is essentially under his charge.

26. The whole block should be connected with each of the pavilions, but this is not shown though the Committee recommended this arrangement. Indeed so far as the Block Plan of the buildings proposed to be erected on the Race Course shows the respective position and arrangement of the several buildings, the two pavilions for different Regiments are connected, which is neither necessary nor desirable; and the Administrative rooms are placed at a considerable distance and detached, which is objectionable.

27. In lieu therefore of Plan F. as shown in accompanying drawing, a building might have been made to contain on the ground floor an Operation room, the projecting portion of which should not be built over and which should have a dome over the Operating table. The upper floor of this building would afford sufficient accommodation for two resident Apothecaries and two would be required if there are two different Regiments to be provided for separately, while the Surgery below stairs, might during the day, after the sick had been inspected, be used by the other Medical subordinates as a Day room. The arrangements proposed are shown below and one recommended in lieu of Plan F. of the Department Public Works.



28. Each of the plans (No. 5) for Serjeants' and Medical subordinates' quarters might be then reduced to one-half its present size, and I think that the out-offices of the Hospital Serjeants' Quarters might be arranged as shown in Block Plan (vide para. 37.) This design is recommended as separating the Cook-room and Privy and affording better ventilation for the last-named apartment; the removal of the walls at the end of the front verandah will promote the ventilation of the house itself.

29. Plan No. 3, *Medical Officer's and Subordinates' wash-house*, might be altogether got rid of as a distinct building. I am constrained to observe that the erection of this separate building would appear to be a perfectly unnecessary way of meeting the requirements of a Commissioned or even Warrant Officer, who should certainly be provided with a suitable bathing room on the premises where they reside.

30. If the suggestions now made were to be carried out, some economy in point of construction could be effected in most of the buildings hitherto examined, and the inadvisable grouping together of Officers' quarters with Operation room and Dispensaries could be entirely avoided. It

will be seen (para. 27) that I have suggested that provision should be made for two resident Apothecaries; similarly it may perhaps be found necessary to provide accommodation for 2 Hospital Serjeants and for 2 Medical Officers.

31. This should for Officers be done by a separate building to windward of the Hospital and not to lee ward as suggested in the Department Public Works plans.

32. The Administrative apartments (Dispensary, Receiving room, &c.) might also be placed between and behind the two pavilions. The buildings would then be relatively placed as shown in the accompanying plan of this Commission.

33. One very marked requirement of the proposed Hospital has been overlooked in the plans under consideration—no separate Wards have been provided for contagious or infectious cases requiring more complete separation than is possible under the same roof as that covering General Wards.

34. I have therefore provided for two small buildings (marked in Block Plan by this Commission "Separate Wards") each to consist of 3 rooms and to be used for cases of Cholera, Small Pox, &c. The necessity of this provision for contagious cases is recognized by all Medical authorities in India.

35. For the Female Hospital two similar Wards are provided.

36. The site for this building proposed by the Department Public Works is generally approved, but it is like the Male Wards open to objections as regards the double verandahs, ventilation, latrines and lavatories.

37. I would suggest that an Hospital be built as shown in Plan by this Commission, namely, one Ward and two small rooms for each Regiment with detached Cook-house and Matron's quarters. The latter to be built on the same plan as those for Hospital Serjeants.

38. I cannot forward this Report without again urging upon the notice of His Excellency the Commander-in-Chief the great desirability of adding a third pavilion for the Men's wards and additional Wards for Females, so that all the Europeans of the Garrison may be treated here and thus the advantages of a good General Military Hospital be secured to this important Station.

I have the honor to be,

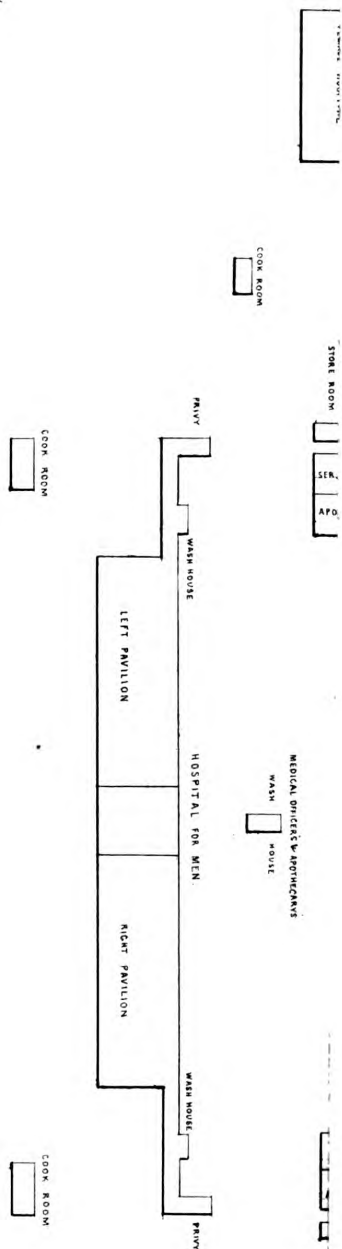
Sir,

Your most obedient Servant,

(Signed) R. S. ELLIS,

President, Sanitary Commission.

Designed by A. Burton





APPENDIX F.

OFFICE OF SANITARY COMMISSION,
MADRAS, 31st March 1865.

No. 605A.

From

THE HONORABLE R. S. ELLIS, C. B.,
President, Sanitary Commission, Madras.

To

COLONEL CHARLES A. ORR, R. E.,
*Secretary to Government, Public Works Dept.,
Fort St. George.*

SIR,

I have the honor to acknowledge the receipt of Proceedings of Government, dated 17th January, and Order Thereon, No. 155.

2. I beg to point out that the Circular letter by Colonel Strachey, is dated 25th November 1864, and also, that the Order of the Madras Government, 17th January, did not reach this office until one month and six days after its date.

3. The papers contained in these Proceedings have been carefully considered by this Commission, and I have to submit the following observations for the consideration of Government.

Hospitals for Native Troops.

4. In accordance with orders of Government, the scale of accommodation to be provided for Native Troops has been fixed. But as the "full Regiment" of Bengal may not accord with the "full Regiment" of the Madras Presidency, I thought it advisable to place myself in communication with the Principal Inspector General, as regards the proportion of sick to the strength of the Cavalry and Infantry Regiments of the Native Army in this Presidency.

5. I have just received this return, and am therefore now able to submit the reply of this Commission to your requisition in a more complete form than I could otherwise have done.

6. There was some difficulty in fixing on the numbers of sick to be provided for, as there were up to this time no statistics available to give the requisite data upon which to base any conclusions. But the information afforded by the Principal Inspector General shows that—

(1.) In four Native Cavalry Regiments the average annual daily sick of three years varied from 4 to 16, the mean average being 9. But the highest monthly average rose as high as 21, and 8 was the least number, the mean average of highest monthly sick being 14.6. But as there are a number of followers who might require treatment, and as some cases may require additional accommodation or seclusion, I think provision should be made for 25 beds, in four Wards, one for 17—one for 6—and 2 for one patient each. To these should be added a Surgery Receiving room, Bath room, Washing room, Latrine and Scullery, houses for Apothecary, Dresser, Hospital servants, two separate Wards, Cook-room and Dead house, and Hospital Clothing Store. The principles of construction and general arrangement of such a building should be in accordance with the plans proposed by this Commission for a Native Infantry Hospital.

(2.) Very great variations appear between the highest and lowest annual average daily sick in Native Infantry Regiments. The lowest being only 5 and the highest 64, the mean annual daily sick of one Regiment being 17½. An equal variance is observable between the highest and lowest monthly average of daily sick, which are represented respectively by the figures 7 and 128: the mean highest monthly sick being 30⅔.

On the whole, it is believed that 40 cots will be sufficient for ordinary sick, although in some instances this amount of accommodation may not be required. Colonel Crommelin assigns 48 cots and 2 special Wards for the same purpose ; we think this somewhat in excess.

7. I may observe, however, that the general salubrity or otherwise of a station should be strictly borne in mind, for at stations where fever is frequently witnessed a much larger amount of accommodation would be required than at others where it is rarely prevalent.

8. In my present observations, therefore, I shall confine myself to the consideration of such principles of Hospital construction as are worthy of determination. In discussing these I purpose chiefly to submit the remarks of this Commission upon the "Plans" and "Recapitulation" of Colonel Crommelin.

9. This Commission entirely concurs with Colonel Crommelin, that upper stories are not required for Native Hospitals, except in situations where want of space may demand an upper floor to be added. A well-raised basement should, however, be invariably provided, and this recommendation applies especially to stations on the Western Coast in this Presidency.

10. The number (60) fixed by Colonel Crommelin to be contained in one building is larger than that ordinarily required by any Native Infantry Regiment in this Presidency. But I am inclined to think that the limit of sick to be aggregated in one building, *i. e.*, under one roof, is as necessary to be defined in Native as in European Hospitals, and for the same reasons.

11. As to the apartments required to constitute a good Hospital for Native Infantry or Cavalry, this Commission concurs generally in the observations under notice. But it is also our opinion that the precise use of individual apartments may be somewhat better arranged ; and that the relative position of some of these might be altered with advantage.

12. Three general Wards will probably suffice for the treatment of ordinary Regimental sick. But as it is necessary to make suitable provision for cases of *contagious disease*, it appears desirable to provide two small Wards each containing two beds entirely separated from the general Wards. These are shown in the annexed Plan as Separate Wards.

13. This Commission concurs with Colonel Crommelin's suggestions regarding the arrangement of beds in the Wards.

14. The superficial space, $97\frac{1}{2}$ feet, assigned by Colonel Crommelin is not so necessary with ridge ventilation as if flat roofs are designed, and this Commission is disposed to recommend 88 as amply sufficient with ridge ventilation. The width of Wards, however, recommended (26 feet) seems open to some objection. The width of Wards in the General Hospital at Madras (occupied by Europeans) is only 20 feet and is found convenient (provided that for Europeans separate dining rooms are attached). The width of 22 feet gives 8 feet clear between the ends of the beds, and this is ample : the width of 26 feet can only be necessary if central tables are required, and these are never seen in a Native Hospital. It has been found too, by experience, that the cost of buildings is greatly enhanced if the width of 22 feet is much exceeded.

15. Another argument in favor of the narrower Ward is the more perfect ventilation that can be ensured by ridge ventilation, and the cost of pointed roofing increases considerably in wider buildings.

16. Should the Government of Madras agree in the propriety of these views, then assuming 88 superficial feet to be fixed as a standard, each native patient would have 8 feet of wall-space in lieu of $7\frac{1}{2}$ allowed by Colonel Crommelin. I think these proportions

better than those suggested in his recommendations—because they give a wider space between adjoining beds.

17. As this Commission recommend one-storied buildings, they would prefer to see them with tiled roofs and ridge ventilated—the height of the Wards to wall-plate should be 15 feet and to ridge 22 feet : thus each patient would have 1,628 cubic feet of breathing room, with abundant ventilation by the ridge and attics. The doors of the Wards, I think, should be provided with panes of glasses for their upper third, and one or two of these in each door might be fitted with hinges so as to open if required.

18. The verandah may, with a view to economy, be made by continuing the roof down at the same incline as over the Wards. If, however, the verandah is 8 feet wide, the roof would then be only 11 feet high at outside and no swing attics could be introduced with good effect. This Commission would prefer that the verandah should be made flat-roofed and level with the Ward walls, with swing ventilators under the verandah-roof and over each door and window. The verandahs need not be more than 8 feet deep.

19. In illustration of the foregoing and subsequent remarks of this Commission, Native Infantry Regimental Hospital proposed by this Commission. I forward block sketch of an Hospital with all necessary out-offices and subsidiary buildings—this plan shows the size and arrangement of the different rooms in sufficient detail.

20. Colonel Crommelin's "recapitulation" contemplates single-storied buildings only. In this, this Commission concurs with him.

21. Colonel Crommelin considers that a single building will be sufficient for the whole Hospital. This Commission is somewhat inclined to question the propriety of this rule. We are of opinion that apartments for Executive offices, Apothecary's Quarters and separate Wards for contagious cases, should be detached more or less from Wards to be occupied exclusively by sick persons, and the relative position of these latter rooms could, in our opinion, be better arranged.

22. The internal organization of a Native Infantry Regiment is doubtless somewhat different in Bengal from that prevailing in this Presidency, and this must be borne in mind in considering the "component parts" of which a Native Infantry Regimental Hospital should consist.

23. Provision should be made for (say 36) sick in general Wards, 3 in number to contain 20, 10, and 6 patients respectively. Two small Wards each for 2 "special cases" should also be provided in the same block but cut off from the other Wards.

24. There should also be one or two "separate" Wards for contagious cases entirely apart from the main building, each to contain two beds.

25. Connected with the main building there should be a Surgery easily accessible to all Wards, but not necessarily under the same roof. Pavilion construction would meet this view, and we would recommend that this mode of building be adopted, and that next to the Surgery there should be a "Receiving Room" for men to be seen in when reporting sick or for the examination of convalescents attending daily during the Surgeon's visit.

26. As this room would be only required for an hour or so daily and chiefly during the Surgeon's visit or on the occurrence of accident or sudden illness, at both which times the Medical subordinates would be professionally engaged, this Commission is of opinion that the "Receiving room" could be made to answer as a Day room for the Apothecary, or Dresser, or Pupils on duty.

27. The usual allotment of Medical subordinates to a Native Infantry Regiment in the Madras Presidency is one Assistant Apothecary and one Dresser. These persons are, as a rule,

married, and we think that suitable residences for them should be provided near to, but not forming an integral portion of, the Hospital.

28. I proceed to remark on the situations proposed by Colonel Crommelin for the subsidiary buildings required as Privies, Lavatories, Cook-rooms, Servants' apartments, &c.

29. It is proposed in the papers under report to have two sets of privies. The necessity for this is very questionable. Assuming that 40 men are in Hospital, not more than 12 privy seats can possibly be required, and this is greatly in excess of the usual allotment to Hospitals; but we intentionally allow six compartments to be attached to each wing of the proposed Hospital. These compartments should be made as separate as possible from the adjoining ones and should be sufficiently removed from the Wards and not open directly into the verandahs as shown in Colonel Crommelin's plan.

30. These apartments should be to the rear of the two wings of the Hospital occupied by the ordinary sick and should be approached by covered ways. The privies should be worked on the "Dry Earth" system.

31. At either side of the passage leading from the Hospital verandah to the privy, and opening from the Hospital verandah, should be two Bathing rooms, one of them with fixed baths and one for ordinary bathing, and a small scullery should be placed at the side of the passage connecting the Executive rooms with the sick Wards and a small store for Hospital clothing.

32. The accompanying plan will show the dimensions of all these buildings and their relative position.

33. A Cook-room might be provided, although this Commission somewhat questions the necessity for it. All cooking for men in Hospital in this Presidency is done by the families in the Lines and the food is brought to the men. But a Cooking-room might prove useful for the preparation of soups and other articles of extra diet and for keeping the Surgery supplied with hot water, &c.

34. A Guard room should be built in front of the Hospital in some central position overlooking the main building, and this with a surrounding dwarf wall with railing would prevent men leaving the Hospital at night or receiving supplies of food or liquor surreptitiously.

35. A Dead house is an essential element of Hospital construction that has been too often overlooked. Although, as a result of native prejudice, *post mortem* examinations are rarely held, yet it is exceedingly desirable that dead bodies should not be allowed to remain in Wards occupied by sick patients.

36. The servants of all Native Infantry Hospitals should be provided with quarters, as their absence at their houses for meals, &c., interferes very considerably with the efficient performance of their duties.

37. I have before recommended that the dry earth system of conservancy should be adopted, and this would necessitate the provision of two soil carts to each Hospital. The one in use should be kept in the Cart shed shown in the design for the lavatories and privy.

Hospitals for European Troops.

38. I intentionally defer to another opportunity entering upon the question of the desirability or otherwise of instituting General Hospitals at large stations for European troops, and for the reasons assigned by Colonel Crommelin confine my remarks to

the opinion of this Commission regarding the proposed plans submitted for, and the principles to be adopted in designing, Regimental and Detachment Hospitals for Europeans.

39. This Commission agrees generally in Colonel Crommelin's calculation that accommodation at the rate of 12 per cent. will suffice for the sick of European Troops at ordinary stations. An examination of the Returns contained in the Proceedings of Government, dated 26th August 1864, with Order No. 2,972, and those dated 13th September 1864, with Order No. 3,226, gives the following results as regards European sick for the last five years.

Ratio per 1,000 daily sick to strength.	
1 Thyetmyoo.....	44.94
2 Kamptee.....	50.92
3 Wellington.....	51.70
4 Waltair.....	54.59
5 Bellary.....	57.09
6 Trimulgherry.....	58.47
7 Cannanore.....	60.57
8 Rangoon.....	60.96
9 Tonghoo.....	65.25
10 Secunderabad.....	67.46
11 Madras.....	67.62
12 Bangalore.....	68.73
13 Trichinopoly.....	82.08
14 Saint Thomas' Mount.....	88.08
15 Poonamallee.....	136.97

But it must be remembered that during epidemics a greatly increased number of sick would require to be provided for. On these grounds and

in accordance with practical experience, I think that Colonel Crommelin's estimate should be accepted as the rule.

40. This Commission concurs in the proposal that sick should be treated in upstairs rooms, and the only argument against it is the cost of providing such accommodation. But if the sanction of the Supreme Government is accorded to this arrangement, it will then be only necessary to utilize to the greatest possible extent the lower or ground floor.

41. This Commission is, however, strongly opposed to third or fourth stories, as we believe that they would be found practically exceedingly inconvenient. Proper supervision of patients would be almost impossible without entailing extreme fatigue upon Medical subordinates, Orderlies, and attendants, and the transport to upper Wards of food, water, clothing and medicine, would be difficult.

42. In the case of General Hospitals, contemplated by Colonel Crommelin as possibly requiring these additional upper stories, an increased number of pavilions connected by arcades would, with much greater convenience, meet the required end, namely, increased accommodation.

43. It should also be remembered that, if the principle of fixing a limit to the number of sick to be aggregated under one roof be admitted, and if sick Wards are to be supplied with all necessary apartments shown in Colonel Crommelin's Plan II, the lower floor would not provide sufficient space for "day," "orderly" and "dining" rooms for three stories.

44. The Commission for the improvement of Barracks and Hospitals recommend that in warm climates not more than 60 sick persons should be placed under one roof, and 2 Wards of 24 sick would, with a very few convalescents and special cases fully reach that number on the upper floor alone.

45. Colonel Crommelin's argument in favor of the non-necessity of minute segregation of Military sick possesses considerable weight, but this Commission desires to point out that in many of the Hospitals in this Presidency, not only is the space per cot afforded to the sick below the standard of accommodation now recommended, but the cots are so few in number as to be almost constantly occupied. Colonel Crommelin's views, therefore, can only be upheld if all Military sick are treated in upstairs rooms and if cots are provided at the rate of 12 per cent.

46. As regards the number of Wards to be provided for the sick of a Regiment, or other branch of the Service, this Commission is of opinion that Wards containing 24 patients each

should not be unnecessarily multiplied, and on this point would remark that Colonel Crommelin has selected the maximum number allowed by the Commissioners who reported on Barrack and Hospital improvement. The small Wards in his plan also only allow special accommodation for 4 persons out of a Regiment 920 strong.

47. This arrangement seems open to improvement. There should, if possible, in every European Hospital be rooms sufficiently capacious for from 6 to 12 patients labouring under skin disease or other contagious affections not of a malignant character, and who might exceed in number the accommodation provided in distinctly separate and detached Wards.

48. Cases of eye disease (non-contagious) might also require separate accommodation in apartments more airy than ordinary special Wards, and, above all things, it is desirable that one or two middle-sized Wards should be provided, into which the remaining patients of a large Ward could be shifted if, after continuous occupation, it required to be cleansed.

49. For these reasons this Commission would be glad to see some alterations in the allotment of patients to the several Wards, and would therefore suggest that each European Infantry Hospital should contain,

2	at	24	Cots = 48	Cots	(General Wards)
2	"	16	" = 32	"	(Middle-sized ")
2	"	6	" = 12	"	(Small ")
4	"	2	" = 8	"	(Special ")
1	"	12	" = 12	"	(Convalescent ")

112

50. Similarly for a Cavalry Regiment we would recommend :—

1	Ward	at	24	=	24	Cots	(General Ward)
1	"	"	16	=	16	"	(Middle-sized ")
2	"	"	9	=	18	"	(Small ")
2	"	"	2	=	4	"	(Special ")

62

51. For a Light Field Battery we would assign the same allotment as that recommended by Colonel Crommelin.

52. For an Infantry Female Hospital we would allot,—

1	Ward	at	10	=	10	(General Ward)
1	"	"	6	=	6	(Small ")
2	"	"	2	=	4	(Special ")

20

53. For a Cavalry Female Hospital we would fix the following numbers :—

2	Wards	at	6	=	12	(Small Wards)
1	"	"	2	=	2	(Special ")

14

54. There is one element of Hospital construction somewhat hastily passed over by Colonel Crommelin and before alluded to in this Report. I here refer to the desirability of affording small Wards to be used if required as Ophthalmic Wards. Another point requiring attention is the provision of distinctly separate and detached Wards for cases of epidemic disease.

55. This latter precaution should be invariably adopted, and in the Plan No. 2 submitted with this Report, I have shown the relative position they should occupy with reference to an Hospital chiefly in two pavilions and supposed to face the prevailing wind.

56. This Commission cannot concur in Colonel Crommelin's argument as to the necessary expense attendant upon the erection of these separate Wards, for beyond very limited Latrine and Bath-room accommodation, nothing but Wards would be required.

57. These Wards would, as a rule, be sparingly occupied, and often, it is to be hoped, closed altogether, and the patients in them would not usually need Day rooms, Dining rooms, or Attendants' rooms to be built. They would be attended by the general staff of servants, and would probably during their detention here be confined to their beds. Cholera patients, those suffering under small-pox, &c., should not be introduced within the buildings occupied by ordinary sick. If they are, disease originally sporadic may become epidemic, and the most serious results ensue.

58. These separate Wards need not be numerous nor need they be calculated to hold very many patients; indeed, in them, minor sub-division is urgently required, so that the permanent cleansing of them after occupation can be rapidly effected at small cost. They should at all times be kept thoroughly clean and prepared for occupation on the shortest notice.

59. As to the questions raised by Colonel Crommelin regarding the necessity of these separate Wards in small Hospitals, this Commission would observe that if the necessity of them be admitted, and we entertain no doubt of it, they must be an essential part of all Hospitals, large or small, and herein consists one of the manifest advantages of "General" over "Regimental" Hospitals.

60. The erection of several sets of these Wards is avoided, and thus considerable expenditure is rendered unnecessary, while the attention of the Medical staff is directed to the existence of infectious disease against which they can adopt the proper precautions.

61. Colonel Crommelin's argument against too great sub-division of Wards is based on two considerations, the difficulty of ventilation and the increased cost of supervision and nursing.

62. On the first point I may observe that if a building consist simply of single rooms with verandahs front and rear, no difficulty can be experienced if sufficient doors and windows be provided and if tubular shaft ventilation be insisted on. As to the second point, it yet remains to be seen how far the introduction of trained Nurses is practicable, and according to what system it is to be carried out before it is possible to calculate upon the effect of the slight sub-division of Hospitals, recommended in the Remarks.

63. The plan proposed by Colonel Crommelin of placing cots *along* instead of *across* the Wards appears to be a good one, and the provisions for altering the plan architecturally to meet this intention seem well calculated to allow of this arrangement of the cots.

64. For the reasons before stated, this Commission would prefer Wards only 24 feet wide.

65. 120 square feet is fully sufficient superficial area per bed in convalescent Wards. In large well-ventilated General Wards 126 feet would probably be sufficient—130 in medium Wards, and about 150 in Special Wards.

66. The proposals regarding Ward Lavatories are identical with those long advocated by this Commission, and it is observed the recommendation submitted by us with reference to the General Hospital at Madras is here repeated, namely, that fixed tubs and basins

should be provided, and that a urinal should be erected in these rooms. And when required a supply of hot and cold water should also be available.

67. I would recommend that Privies on the dry earth system should be provided, but not situated as shown in Colonel Crommelin's design, but placed directly behind each pavilion both on the upper and lower floors.

68. This Commission does not believe that Water closets are desirable in India. Even in a temperate climate they are often a source of nuisance, and with the known careless habits of Soldiers they are almost certain to prove so in India. Besides at many stations water may not be easily laid on, and the dry earth system has proved so successful and is so easily managed, that I would prefer the introduction of it to that of Water closets, which are almost certain to get out of order.

69. The proportion between the Dining and Day rooms on the ground floor does not meet the approval of this Commission, as the Dining room designed by Colonel Crommelin is too small, and the Day room is unnecessarily cut off from the Dining room.

70. This Commission is of opinion that quarters for the Apothecary should not be detached from the body of the Hospital, but in close proximity to it. This Officer should, like the Hospital Sergeant, be accommodated in the administrative block, and upstairs.

71. The quarters of the Hospital Sergeant should similarly be adjacent to, but detached from, the body of the Hospital (vide Plan by this Commission.)

72. Good rooms for the reception and proper stowage of Soldiers' kits are essential to a good Military Hospital, as are rooms for Hospital clothing, &c., &c.

73. We think that the Surgery and Receiving room would be better in a detached building, the upper portion of which could be occupied by the Hospital Sergeant and Apothecary.

74. The proposed kitchen should be, like the Dead house and separate Wards, to leeward of the Hospital.

75. The Lavatory on lower floor of Hospital need only be very small but with one good hot, or cold bath, also a shower bath to be used only by Orderlies, not by patients. The foregoing remarks apply to the lower privy.

76. The Guard room should be at the entrance of the Hospital compound and not in the body of the Hospital.

77. Shed for ambulance cart and hearse should be behind the Hospital or to one side.

78. It only remains for this Commission to submit a plan for an European Infantry Regiment exhibiting our views of the alterations that might be made in Colonel Crommelin's designs. This plan will sufficiently explain our views regarding the relative position of the several buildings requisite for the accommodation of 112 sick. The number of Wards required for this purpose has been already detailed, and the accompanying block plan will sufficiently show the arrangements we propose.

79. In submitting it for comparison with that of Colonel Crommelin, I beg first to direct attention to certain objections to his "block plan" (I.)

80. Supposing the Hospital to face the direction from which the prevailing wind comes, we consider that the Cook rooms and Wash-houses are badly placed, and that the covered passages con-

necting these with the main building are calculated to prevent perfect ventilation between the two large blocks of buildings on either side.

81. We further consider that the Hospital privies and Bath rooms are badly placed as regards the convenience of patients resorting to them, they being at the ends of the building.

82. We would prefer that Administrative offices, Receiving room, Surgery, &c., Apothecary's quarters, and those of the Hospital Sergeant, should, if possible, be detached from the buildings containing sick men, and we would desire to provide a good Office and Record room which is essential to the efficient working of an Hospital.

83. In explanation of these views, I submit plan of a building which will contain Operation room, Surgery, Receiving room, Office and Record room, on the ground floor, and above, quarters for an Hospital Sergeant, Apothecary, and Committee room.

84. The Operation Theatre is proposed to be lighted by 3 large windows at the end and (not being built upon) by a dome over the Operation Table.

85. The quarters for the Apothecary and those of the Hospital Sergeant are composed of sitting room 20×19 , bed room 20×19 , store room 13×15 , and bathroom 6×15 .

86. The building containing the executive apartments should, in the opinion of this Commission, be placed behind and between the two pavilions constituting the main body of the Hospital, and thus be easily accessible to all persons engaged in the management of the Hospital.

87. In compliance with your wish, I submit this Report in printed form, and beg that it may be laid before Government with as little delay as possible, with a view to its being considered and forwarded to the Supreme Government.

I have the honor to be,

Sir,

Your most obedient Servant,

R. S. ELLIS,

President, Sanitary Commission.



APPENDIX G.

No.

OFFICE OF SANITARY COMMISSION,
MADRAS, 19th April 1865.

From

HONORABLE R. S. ELLIS, C.B.,
President, Sanitary Commission, Madras.

To

COLONEL H. MARSHALL,
*Secretary to Government, Military Department,
Fort Saint George.*

SIR,

Proceedings of Government, Military Department,
No. 4,314, dated 2nd December 1864.
Proceedings of Government, Military Department,
No. 3,338, dated 21st September 1864.
Proceedings of Government, Military Department,
No. 403, dated 28th January 1865.
Proceedings of Government, Public Works Department,
No. 648, dated 8th March 1865.

I have the honor to acknowledge the receipt
of the Proceedings and Orders of Government, No. and
date as per margin, relative to the subject of the stabling
Cavalry and Artillery horses.

2. I request that the following observations may be submitted to the Honorable the Governor in Council, with a view to a re-consideration of the dimensions of space to be allotted to each horse and of the style, generally, of construction to be adopted.

3. The consideration of these subjects was brought before this Commission in consequence of the submission to us by His Excellency the Commander-in-Chief of a proposed set of stabling for sick horses at Bangalore (copy of this is appended to this letter) and marked Plan A.

4. On it I submitted the following observations in my letter No. 420, dated 5th January 1865 :—

“ This Commission is inclined to think that the flat roofed stalls without verandahs shown in this plan would not afford sufficient protection to sick horses. Rain falling with wind blowing towards these open sheds would affect the horses nearly as much in these as in the open maidan.”

“ A building with side walls with proper openings for ventilation and leaving two feet open space above, with pointed roof (ridge ventilated), and with a central passage between the horses, (facing outwards) would at once afford admirable opportunity for careful supervision and for complete protection from the weather.”

“ In the same building a sweating room foot-bath stall with apparatus for swinging horses, &c., should be included, as also a Surgery, room for Line articles, &c.”

5. A plan of sick stables constructed on this principle and capable of modification for ordinary stables is herewith submitted marked Plan B.

6. The erection of the separate “ Line sheds” proposed for Bangalore can be avoided if they are made an integral portion of the stables for Cavalry and Artillery, which have been recently sanctioned by the Supreme Government.

7. Of the necessity for such buildings there can be no doubt, but this Commission is anxious to bring to the notice of Government the desirability of providing ordinary stabling of a more complete kind than that hitherto proposed in the papers under consideration on this subject.

8. There is no doubt that exposure and even change of weather is injurious to the horse, and of this a good example was brought to our notice by Colonel Thompson, the Remount Agent, who stated that in November last 140 horses were admitted into Hospital with coughs and colds during the few weeks next following a few days of heavy and continuous rain. The total strength of horses at the Depot was 550, so that nearly 25 per cent. were made ill by change of weather alone. Colonel Thompson is also of opinion that horses properly housed would, especially in wet and cold weather, keep their condition better on less food than if they were picketed out.

9. The exposure is equally injurious to the men who have to clean the horses, and no doubt the admissions into Hospital are increased in number from men getting wet in attending to horses picketed out in rainy weather.

10. The means of comparison between the health of mounted Soldiers whose horses are provided with stables with that of the same class of Soldiers whose horses are picketed without cover, are not available; but this Commission has no doubt that the Cavalry Soldier should be protected from heat and rain while attending upon his horse.

11. This Commission is further of opinion that there would be a gain to the State, in the increased efficiency of horses protected from the inclemencies of the weather, more than compensating for the expense of building suitable stables.

12. They most entirely concur in the opinion expressed by the Principal Veterinary Surgeon, Bombay Presidency, that horses are not more proof than other animals against attacks of disease resulting from continued exposure to heavy rain, and there can also be no doubt that exposure to a tropical sun and to land winds is very injurious to horses, especially Australians.

13. As it has been now determined that the horses of the Artillery and Cavalry everywhere shall in future be stabled, this Commission would beg to call attention to a valuable report published on this subject by the Barrack and Hospital Improvement Commission under date 31st October 1863.

14. It is of great importance that horses accustomed to live in the open air should not suffer from want of ventilation when transferred to the shelter of a stable, and although in this country the stabling required need not be of as elaborate a construction as is necessary in England, the remarks contained in the report above quoted will be found most useful in respect of ventilation, light—the cubical space allowed to each horse, and the drainage and conservancy of stables.

15. The necessity for attention to these points in the construction of stables is as great in this as in any other country.

16. It will also be desirable to guard horses from the direct action of the land wind which, as was found in the stables erected at Belgaum, is a fertile source of disease. In this respect the “stables approved by His Excellency the Commander-in-Chief in India” (under date 19th April 1860) are defective, for there is no protection from land wind afforded by open sheds.

17. It is probable that a pan-tile roofing will be found the most economical, but side walls are essential to prevent the access of land wind. Iron roofing is very liable in this country to injury from high wind—and may not be easily or cheaply procurable at all stations.

18. The pavement to be used in stables is also a matter deserving of attention—the requisites are that this pavement should wear well, not become slippery, be water-tight, and be easily cleansed.

19. I may mention that asphalté has been lately employed in France for this purpose with great success, and if properly composed and really well laid, (to which sufficient attention is not paid in India), it would probably answer better than any other kind of pavement. Another good flooring for stables can be made by fire-bricks laid in edge and tested with hydraulic cement or asphalté.

20. It is also necessary to direct attention to the dimensions and mode of construction of ordinary stables as proposed by the Supreme Government. They fix the dimensions of stalls at $14 \times 7 = 98$ square feet with a 6-foot central passage. This would give $17 \times 7 = 119$ to each horse, including the space of the central passage.

21. Colonel Thompson recommends a larger area and a wider passage: he suggests 11×10 as necessary to allow Australian horses to turn, and he further suggests a central passage 12 feet wide. This would give in all 170 square feet per horse inclusive of the passage way. Colonel Thompson, however, would give a loose box to each horse. This, though absolutely necessary in sick stables, may be considered unnecessary in the ordinary Cavalry and Artillery stables, but we are of opinion that a space of not less than 12×9 for ordinary and 12×12 for sick stables should be provided for each horse. The horses in the latter to be in loose boxes.

22. Colonel Thompson says, of a stable at Oosoor—"The passage down the centre is 12 feet wide to enable it to be used for cleaning saddlery and harness, and for Officers and Non-Commissioned Officers to walk up and down when on duty at grooming hours. A small box should be in the corner of each stall to hold the hay or grass, otherwise trampled under foot and wasted; the stable should be open at either end by a large arch which is closed by a door half way up at night or when the current of wind may set in too strongly at either end—the outside walls do not run up to the roof but stop about 18 inches short of it along both sides, the roof being supported on pillars at equal distances and projecting two feet outwards to prevent rain beating in. Thus air is freely admitted all round and through both ends whilst none can blow upon the horses. A brick and chunam drain 6 inches wide runs down under each row of horses with a small oval cistern in the centre of each stall covered with a strong wooden trap perforated with holes—outside the stable at the top of each drain is a chunam cistern into which a barrel of water is emptied twice weekly and this rushes down the drain, washes thoroughly each cistern, and having cleansed all impurities is carried off at the lower end into a drain leading to a dung pit."

23. I beg to forward herewith a design for a sick stable constructed on these principles. The cost of it need not be very much in excess of that approved by His Excellency the Commander-in-Chief in India, for the masonry pillars in each instance would be the same in point of numbers; but the height of them in the plan proposed by this Commission is of necessity greater and the roof more expensive, but the dividing walls shown in our plan can be made of mud or sun-burnt bricks, and the outer wall of the same material between the pillars.

24. The same design would do equally well for ordinary stables with modification in respect to the space assigned to each horse.

This plan appears to possess the following advantages—

- (a.) The central passage allows of horses being brought into or out of the stable without risk, it also affords room for the cleaning of harness which should be done in the stable and not in Barrack verandahs as at present.
- (b.) All harness can be safely kept at night-time away from the Barracks but still well protected.
- (c.) Horses can be cleaned in all weathers without any exposure to the men.
- (d.) All horses will be in stalls of sufficient size.
- and (e.) Perfect protection from rain, damp and land wind, is ensured both to horses and men.

25. For the foregoing reasons we would recommend each sick horse stable—and ordinary stable, should be thus constructed, and that a Troop stable should contain

72 Stalls.

4 Harness rooms, and

4 Line article rooms.

The sick horse stable should similarly contain

Veterinary Dispensary.

Swinging Stalls.

Foot Bath.

Sweating Room.

Boiler, &c., all under the same roof as the sick horses themselves, for whom stalls should be provided.

26. Veterinary Surgeons and Officers Commanding Cavalry and Artillery will be in a position to report upon the probable number of sick stalls required.

27. Soliciting that this communication may be submitted to Government.

I have the honor to be,

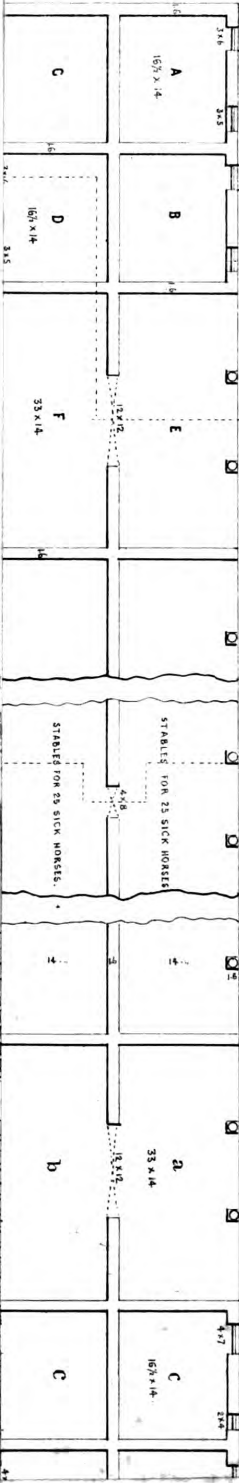
Sir,

Your most obedient Servant,

(Signed) R. S. ELLIS,

President, Sanitary Commission.

BANGALORE.



Office of Sanitary Commission
H. B. Montgomery, M. D., Secy.



APPENDIX H.

No. 678.

OFFICE OF SANITARY COMMISSION,
MADRAS, 25th April 1865.

From

HONORABLE R. S. ELLIS, C.B.,
President, Sanitary Commission.

To

COLONEL H. MARSHALL,
*Secretary to Government, Military Department,
Fort Saint George.*

SIR,

1. I have the honor to submit, in compliance with the Order of Government, No. 388, dated 27th January 1865, the following remarks of the Madras Sanitary Commission, on the subject of the Beds and Beddings of the European troops in India.

2. This subject has for a considerable time past occupied the attention of His Excellency the Commander-in-Chief of this Presidency, and the whole question has recently undergone elaborate enquiry by the Military authorities and the Sanitary Commission of Bengal.

3. The President of the Sanitary Commission for Bengal addressed in September 1864, an exhaustive letter on this subject to the Secretary to the Government of India, Military Department. In the recommendations made by the Sanitary Commission for Bengal, this Commission agrees in all main points.

Cots.

4. It is recommended by the Bengal Sanitary Commission as essential for the comfort and health of the troops that iron cots in all cases should be supplied. His Excellency Sir H. Rose recommended an iron trestle cot which, with slight modifications, the Commission prefers to other cots examined by them. This cot consists of an iron frame work with two or three boards, removable, on which the mattress rests.

5. Improved specimen cots are being prepared in Calcutta; and it would seem desirable to await the result of these experiments before determining upon ordering any further supply of iron cots for the Madras Presidency. The Madras Sanitary Commission entirely concur with the Bengal Commission in thinking the cot devised by Sir H. Rose, superior to Falconer's or any other form of iron cot in use in this Presidency. It affords the least possible harbour for vermin, and the fact that the wooden planks are easily moveable makes it possible thoroughly to clean every portion of the cot.

6. The Bengal Sanitary Commission has been requested to furnish this Commission with the result of the experiment made for the improvement of this Iron Trestle Cot, which seems the best suited for the use of the British Army throughout India.

Bedding.

7. This Commission entirely concurs in the opinion expressed by the Bengal Sanitary Commission that much remains to be done for the improvement of the Soldier's Bedding. The only point upon which this Commission differs from that of Bengal is in the preference given in Bengal to Paillasses over Mattresses.

8. This Commission is entirely opposed to the use of Paillasses, stuffed with straw, and without hesitation, recommend that Mattresses stuffed with good Coir be universally used in both Barracks and Hospitals.

9. The experiment of the cost, durability and comfort of Coir Mattresses has been most carefully made in this Presidency by Dr. Jephson, the Medical Officer of the King's Dragoon Guards, lately stationed at Bangalore, and the result of this experiment has most conclusively shown that Coir Mattresses are admirably suited for Barracks and Hospitals in this part of India.

10. The Mattress recommended by Dr. Jephson has been approved by His Excellency the Commander-in-Chief. It can be made at a cost ranging from four to five rupees. Such a Mattress will last for eight or ten years, it can be easily opened, the coir and ticking washed and the bed re-made. Such a Mattress is in all respects superior to a straw Paillasse which never makes a comfortable bed. The Coir is not in any way injured by washing, and if sufficiently often 'teased' this Mattress is as comfortable in all respects as a Horse hair mattress.

11. This Commission fully concurs in the necessity for Bolsters as recommended by the Bengal Sanitary Commission. These bolsters should be covered with canvass and be stuffed with the same material, Coir, as the Mattresses. Soft pillows should be provided to the extent of 25 per cent. of the average sick in Hospital. These should be of silk cotton, feathers, or curled hair.

12. The objections mentioned by the Bengal Sanitary Commission to the cotton quilts or rezais, have frequently been brought to notice in this Presidency. They should be discontinued as a part of the Soldier's bedding. This Commission also concurs in the proposed substitution of English blankets for the country blankets. In this Presidency it will be of advantage to have two kinds of blankets, one thick for the colder stations of Bangalore, Wellington, Secunderabad and Bellary,—and another lighter, for such stations as Madras, the Mount and Trichinopoly. At these latter stations the lighter blanket would be more comfortable than a heavy English blanket, which would seldom be used.

13. His Excellency Sir Hugh Rose expressed as his opinion that "it is very desirable that the system of bedding being stationary at localities, instead of being moveable with the soldier, should be introduced into this country. This system prevails in England and throughout all other of Her Majesty's colonies, and it is especially applicable to India." The system recommended by Sir H. Rose will be a very great improvement upon that which at present prevails. When the Soldier's bedding becomes a part of the Barrack Store, it will be carefully looked after by a responsible Department, and increased comfort and cleanliness will be the result.

14. As above explained, the Soldier's bedding should consist of:—

1 Mattress.

1 Bolster.

1 Setringee or small carpet.

2 Sheets.

2 English blankets—one of these blankets should, for the Madras Presidency, be of a light description, and in the Plains it would seldom be necessary to issue thick blankets.

1 Leather strap.

15. This Commission concurs in the recommendation that these articles should be supplied by the Barrack department, and that a sufficient quantity be kept in store, so that they can be changed when necessary, and that clean articles of Bedding should be supplied to men in Barracks as follows:—

Mattresses cleaned once in six months.

Bolster cases once in four months.

Setringees twice a year.

Sheets once a week from March (in Bengal, April) to October, and during the rest of the year once a fortnight.

Blankets twice a year.

I have the honor to be,

Sir,

Your most obedient Servant,

R. S. ELLIS,

President, Sanitary Commission.

MILITARY DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following papers :—

From the President Sanitary Commission, Madras, 5th May 1865, No. 22 ; to the Secretary to Government, Military Department, Fort Saint George.

I have the honor to solicit that you will kindly submit, for the consideration and Orders of Government, the accompanying Report on the Station, Barracks and Hospitals of Bangalore, which were inspected by myself and the Secretary to the Commission, in our late visit to that place.

2. In order to render this Report as complete as possible, and that no difficulty may be experienced in referring to plans or to previous correspondence from this Office, I have caused Lithographs of the former to be inserted in those portions of the Report where they are alluded to, and have annexed as Appendices, printed copies of the latter.

Referred for the observations of His Excellency the Commander-in-Chief.

16th May 1865.

From the Quarter Master General, Head Quarters, Ootacamund, 10th June 1865, No. ³₆₃₀₁ ; to the Secretary to Government, Military Department, Fort Saint George.

In forwarding for the consideration and orders of Government, a report* from the Officer Commanding the Mysore Division, relating to certain defects in the construction of the Provost Prison, &c.,

*No. 166, 23rd May 1865.

of the new Dragoon Barracks at Bangalore, I have the honor, by order of His Excellency the Commander-in-Chief, to request that Government will be pleased to decide upon the general question of the expediency of constructing a Military Prison at Bangalore.

2. In their Order, No. 4282, dated 30th November 1864, paragraph 2, Government defer the consideration of the subject to a future time. The time has arrived, the Commander-in-Chief thinks, when the question should be disposed of. His views, as to the propriety of the measure, are already before Government. If Government decide upon the construction of this Prison, the necessity for the new Dragoon Prison on its original plan, will be modified. If otherwise, the alterations suggested by the Officer Commanding the Mysore Division, he would recommend, should be carried out.

From the Officer Commanding Mysore Division, Head Quarters, Bangalore, 23rd May 1865, No. 166 ; to the Quarter Master General, Head Quarters, Fort Saint George.

On recently inspecting the Cavalry Provost Prison connected with the new Barracks at this Station, I could not fail to perceive certain grave defects in its construction.

The Bath-room and Latrine accommodation is cramped, and inadequate to the purpose, and the absolute insufficiency of ventilation is most apparent throughout.

The flooring of the Cells also is on a level with the ground outside.

I have the honor, therefore, to bring the subject to the notice of His Excellency the Commander-in-Chief, with a view to these evils being remedied before further progress is made in completing the building.

From the Quarter Master General, Head Quarters, Ootacamund, 14th June 1865, No. $\frac{48}{6503}$; to the Secretary to Government, Military Department, Fort Saint George.

I have the honor, by order of His Excellency the Commander-in-Chief, to acknowledge receipt of Order of Government, dated 16th ultimo, forwarding, for the observations of the Commander-in-Chief, a Report by the Sanitary Commission on the Station, Barracks and Hospitals of Bangalore.

2. The Commander-in-Chief being at the time in Bangalore, took the opportunity of convening a Committee, presided over by the General Officer Commanding the Division, for the purpose of reporting upon the several questions brought to notice. The Proceedings of that Committee are herewith forwarded.

3. The Commander-in-Chief while generally approving of the decisions arrived at by the Committee, will make but few observations on the voluminous papers before Government for consideration.

4. It will be observed that many of the propositions made by the Sanitary Commission, and concurred in by the Bangalore Committee, have already received the sanction of Government, or have been negatived by it. In each case, the Committee were informed of the fact by the Quarter Master General.

5. The Commander-in-Chief thinks that the provision of day rooms in the new Dragoon Barracks is unnecessary. It curtails the accommodation for dormitories, while the dining room will serve for the day room.

6. One of the chief things which may now be considered to be finally decided is the question, whether the new Hospital on the Race Course should be a General Hospital for all Arms of the European Service or not. Hitherto, the Chief Medical Authorities of the Presidency have resisted the idea of any other arrangement. But, having visited the site of the present Dragoon Hospital and the adjoining space, and having been assured that the Commander-in-Chief had already addressed*
 • *Vide Order of Government, No. 4454, dated 13th December 1864.*
 Government to build a separate Hospital on the ground adverted to for the European Regiment only, it was unanimously agreed that the arrangement was perfectly unobjectionable.

7. Regarding the construction of the General Military Prison at Bangalore, the Quarter Master General informed the Committee, that Government had sanctioned it; but, on referring to the papers, it appears that Government deferred the question for future consideration. In my letter of 10th instant, No. 3, it was urged upon Government, by the Commander-in-Chief, to pronounce definitely on the subject.

8. Government is aware that when there were but two European Batteries of Artillery at Bangalore, it was intended that the Horse Artillery should remain in

their now improved Quarters, and that the Light Field Artillery should be removed from its present Barracks to the Race Course, where three of the eight blocks of Barracks originally designed for eight Troops of Dragoons were available. Since then, however, a third Battery of European Artillery has been sent to Bangalore, and consequently the old Foot Artillery Barracks, which were to have been vacated, still remain occupied.

9. At a time when so large amount of money is required to complete the existing works at Bangalore, the Commander-in-Chief is averse to recommend at present that a new set of buildings should be erected for this Battery. But the necessity still exists and will not be lost sight of.

10. The Commander-in-Chief recommends that the measures proposed by the Sub-Committee of Medical Officers, vide Appendix C and the letter D, in the construction of the new Hospital be adopted, and that the Public Works Department be requested to modify the existing plan accordingly.

11. With reference to the provision by Government, of Quarters for Officers, Medical and Military, for the Regiment and Battery in the Barracks on the Race Course, the Commander-in-Chief desires me to say that that measure must, at some time or another, be taken in hand by Government. At Trimulgherry they have been provided. Though the new Barracks in Bangalore are not nearly so far distant from the Cantonment as Trimulgherry is, the necessity that Officers should live near their duties, is as imperative in one case as it is in the other.

12. The Quarter Master General, who has signed the Proceedings of the Committee, had no opportunity afforded him of perusing the report in draft, otherwise he would have proposed that some amendments should be made in it.

13. The report of the Committee extends only to the European accommodation and to the Lines of the Sappers and Miners. There, therefore, remain the Barracks now occupied by the European Infantry Regiment, the Garrison Hospital, the Lines of the Native Infantry Regiments, the encamping ground, and the European Soldiers' Club, to be remarked on.

14. With reference to the disposal of the present Infantry Barracks, the Commander-in-Chief observes that is a Military, not a Sanitary question, and that though ultimately the Garrison Hospital may be removed into the present Infantry Hospital, the time is yet so remote that no present action can be taken in the matter. For until a new Hospital for the European Infantry Regiment is built, the present Dragoon Hospital, and the present Infantry Hospital or part of it, will both be required for the accommodation of the sick of an entire European Regiment.

15. With reference to the Lines of the Native Infantry Regiments, the Commander-in-Chief will address Government in a separate communication, after communicating with the Officer Commanding the Mysore Division.

16. The selection of encamping grounds in the neighbourhood of Bangalore and elsewhere, has been ordered by Government, and a General Order on the subject generally is under preparation.

17. The Soldiers' Club at Bangalore was tried for some little time to be established, and in the very building the Commission recommend it should be tried, but the result was a failure.

From the Officer Commanding Mysore Division, Bangalore, 22nd May 1865 ; to the Quarter Master General.

I have the honor to forward herewith, for submission to His Excellency the Commander-in-Chief, a Report of the Proceedings of a Committee held at this Station on 19th, 20th and 22nd current.

2. For facility of perusal, the Remarks of the Committee are arranged in the order of the several recommendations of the President of the Sanitary Commission, and they are appended in parallel columns.

3. Inspector General Macpherson, M. D., Officiating President of the Sanitary Commission, submitted certain suggestions for consideration, these are detailed in appendix B of the report of Proceedings. Those points upon which no decision has been recorded, were considered by the Committee as being matters of detail which could be arranged by the Divisional Authorities.

4. I am happy to add that the conclusion of this Committee were arrived at after full discussion, and are the expression of the unanimous opinion of the President and Members.

PROCEEDINGS of a Committee assembled at Bangalore on 19th May 1865, pursuant to order of His Excellency the Commander-in-Chief, dated 17th May 1865.

PRESENT.

	Major General F. P. HAINES.....	<i>President.</i>
<i>Constitution of the Committee.</i>	Colonel R. KNOX, 18th Hussars.	} <i>Members.</i>
	Lieut.-Colonel R. CADELL, Royal Artillery.	
	Do. F. H. SCOTT, Quarter Master General.	
	W. MACKENZIE, M. D. C. B., Depy. Insp. Genl. of Hospitals.	
	J. GORDON INGLIS, M. D. C. B., Depy. Insp. Genl. of Hospitals.	
	Surgeon H. B. MONTGOMERY, M. D., Secretary to the Sanitary Commission.	

Officers in attendance to be consulted. Inspector General of Hospitals D. Macpherson, M. D., Officiating President of the Sanitary Commission, Lieutenant Colonel E. A. Foord, Superintending Engineer 5th Division, and Captain H. Tulloch, Executive Engineer Bangalore, were present by desire of His Excellency the Commander-in-Chief.

Authority under which Committee is assembled. 1. The President reads the Order constituting the Commission, (*vide* Appendix A) and requests Surgeon Montgomery, M. D., to record the Proceedings.

Objects of enquiry. 2. The President informs the Committee that it is assembled to consider and Report upon certain recommendations of the President of the Sanitary Commission, regarding the Barracks and Hospitals for Europeans at Bangalore.

3. The Officiating President of the Sanitary Commission hands to the President of the Committee a letter, dated this day, the several propositions in this letter were incidentally discussed in connection with the several recommendations of the President of the Sanitary Commission in his Report on Bangalore, which is formally laid before the Committee, together with Inspector General Macpherson's letter. (*Vide* Appendix B,) Surgeon Montgomery submits for the information of the President and Members, copies of the suggestions in regard to Sanitary works required for improving Indian Stations, prepared by the Barrack and Hospital Improvement Commission.

4. The Secretary submits the following recommendations in the above named Report, and the several decisions of this Committee thereon, are recorded.

New Barracks on the Race Course.

<i>Subject.</i>	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
Allotment of Barrack accommodation.	1. That 85 square feet superficial area should be adopted as the fixed Regulation Standard, for Europeans in Barracks at Bangalore. 2. That three new Barrack Blocks be constructed or such number as may be required to accommodate at this Standard, one Regiment of European Cavalry and two Batteries of Artillery, if it is finally decided that this force should be placed on the Race Course.	5. Having carefully considered the proposals of the Sanitary Commission, regarding the sub-division and mode of occupation of the new blocks of the Race Course Barracks, the Committee resolve to recommend that the central portion be divided as recommended by the Sanitary Committee. Also that seven men be accommodated in each of the day rooms, No. 1 and 7. The central day room being devoted to its proposed use. The total occupation will then be, in three central rooms, 66 men, and in two Verandahs 14, in all 80 men in each, or 640 unmarried men in 8 blocks. This calculation is dependant on the total removal from the Barrack premises of Harness and Saddlery of all kinds. The plan of sub-division is advocated by this Committee in compliance with the recommendation of the Home Committee, for the improvement of Barracks and Hospitals, and as these Barracks face the prevailing winds.
Drainage.	3. That a system of drainage by open V shaped Granite channels should be constructed for these Barracks.	6. The special attention of Government is requested to the immediate preparation of a working plan of drainage, and (as recommended by the Sanitary Commission in paragraph 91 to 94 of their Report) a thorough system of drainage is required — water falling on the open spaces between, and the roofs of the Barracks and subsidiary buildings should be conducted by pipes into open V shaped Granite channels to terminate in a masonry conduit, whereby rain water and foul water, from Cook-rooms, Lavatories and private dwellings could be carried off to a distance to Leeward of the Race Course, there to be utilized, as in England, in the cultivation of meadow lands. The drainage from the Hospital should be complete in itself, and at its origin independent of the general surface drainage.
Do. of Hospitals.		As the foundations of the Barracks are very low, it is also desirable that to ensure their dryness after rain, a pathway four to five feet in width, flagged with granite should pass round each Barrack and block of family buildings, &c., on the road side of this the V shaped channel to receive rain water from the roofs of the Barracks and rain fall on the roads should be constructed.
Flagged pathways.		
Day earth Conservancy.	4. That all Latrines and Urinals should be worked exclusively on the Dry Earth system as proposed by this Commission.	7. The Committee desire to submit to His Excellency the Commander-in-Chief their strong recommendation, that early measures should be adopted to apply the dry earth system of Conservancy to these Barracks, and they request Surgeon Montgomery, to communicate with Captain Tulloch, and to prepare a plan for adapting the present Latrines and Urinals to the new system. (The Report of this Officer is contained in appendix D.)
Day and dining rooms.	5. That in all Barracks the men occupying any sleeping room should employ the adjacent closed Verandahs as day and Dining rooms, and that the lighting of Barracks be improved.	8. As will be seen by reference to paragraph 5 of these Proceedings, this Committee recommend that two day rooms, Nos. 1 and 7, should be occupied by Cots, but the Committee strongly recommend that the central day-room in the front Verandah should be well lighted until 10 o'clock at night, to be used as a reading room for men not subscribing to the Library, or others who may not feel disposed to retire to rest previous to that time—also that the quality of the oil used in Barrack rooms should be improved and its quantity increased; also that Coconut-oil should be used in Libraries, Reading-rooms and Recreation rooms.

Subject.	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
<i>New Barracks on the Race Course, &c.—(Continued.)</i>		
Canteen.	6. That the Canteen should be improved as suggested in paragraphs 59 to 61.	9. The recommendation regarding the improvement of the Canteen is approved by this Committee, Colonel Scott states that His Excellency the Commander-in-Chief has expressed his approval of it also.
Construction of future Latrines.	7. That in the construction of all future Latrines and Urinals, the style of building proposed by this Commission should be adopted.	In the buildings on the Race Course the works will require simply adaptation to the dry earth system and not reconstruction. In future buildings construction more in accordance with the views of the Sanitary Commission may prove desirable.
Cook-rooms.	8. That all Cook-rooms should be provided with Duff's or Grant's Cooking Ranges, a suitable supply of culinary articles, tables for cutting and preparing meat.	10. The Committee approve of this suggestion, and desire to direct attention to the want now so generally witnessed of suitable Tables for preparing and dressing meat, &c., and of proper culinary apparatus. They also observe that additional light is required in these rooms. This can be afforded by placing glass windows in lieu of the present honeycomb masonry openings. This should be done without delay even in anticipation of the receipt of Duff's Ranges.
Workshops.	9. That additional Workshops should be built.	11. The Committee consider the proposed Workshops unsuitable, both as to number and size, for the reasons assigned in paragraph 85 of the Report of the Sanitary Commission.
Permanent stabling.	10. That permanent Stabling should be provided for all Horses.	12. The Committee cordially concur in the propriety of this suggestion.
Family Quarters.	11. That future family quarters should be made to measure 16 x 14 and 14 x 10 in two rooms with Verandahs front and rear.	13. This Committee fully agree in the propriety of these recommendations regarding future family quarters.
	12. That family quarters should have the Cook-room and Privy separated.	14. Approved.
Latrine accommodation for Schools.	13. That suitable Latrine and Urinal accommodation should be attached to all Schools.	15. This suggestion is approved and is especially required where Schools are at a distance from family quarters.
Proposed General Military European Hospital.	14. That a General Hospital should be erected on the Race Course for all European Soldiers in Bangalore.	16. The Committee concur in the objection of His Excellency the Commander-in-Chief, that the distance between the old Dragoon Barracks and the Race Course is too great to allow of the rapid transfer of Sick, and they would prefer the Hospital on the Race Course to include only the Sick of the Force in Barracks there. The Committee also understand that Government has been addressed by His Excellency the Commander-in-Chief, who solicited that a new Hospital may be built for the old Dragoon Barracks. If this is done then no necessity will exist for the erection of a General Hospital for all Europeans.

As regards the style of Hospital to be built on the Race Course, the Committee recommend that an Hospital be constructed on the Plans suggested in Appendix F of the Bangalore Report.

But if this be objected to, on the score of expense, and in consequence of the admirable site proposed for this Hospital, then the Hospital now under construction should be altered generally accord-

Subject.	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
<i>New Barracks on the Race Course, &c.—(Continued.)</i>		
Plunge Bath.	15. That a Plunge bath be erected on the Race Course.	ing to the recommendations contained in letter, No. 531 of the President of the Sanitary Commission, (Appendix E of Bangalore Report). On this subject, Drs. Mackenzie, Inglis and Montgomery submit a detailed Report, (<i>vide</i> Appendix C) of these Proceedings. The suggestions therein contained are approved. 17. Has already been sanctioned, but is urgently required.
General observations.	16. That the Native village close to the Northern corner of the Race Course should be removed, and that the making of Bratties, &c., and all other offensive occupations, as those of Butchers, Tanners, &c., should be interdicted in the vicinity of these Barracks.	18. This village should be entirely removed.
Stables.		19. In the opinion of this Committee where granite is continued in use as flooring of Barracks, hydraulic cement should be introduced to bond the granite slabs and to prevent percolation of moisture through the intervening chinks, the slabs of granite should be also dressed. When granite is not procurable and inferior stone only is to be obtained, the Committee consider that asphalt should be used. 20. The Committee agree that it is desirable that the Stables for Hussars should, on Sanitary grounds, be removed 25 yards further back from the Barracks, and that the Sick Stables be placed behind the Racket Court, and that a corresponding change of position be made as regards the Artillery Stables. The Committee observe that to carry out these changes it will be necessary to remove the Gram shed now in existence. But it is understood that this building is constructed faultily and may in any case require to be re-built.
Temporary water supply.		21. The Committee further recommend that arrangements be made to provide temporarily for a supply of water from the tank and wells in the immediate vicinity of the site approved for Horse Lines, independent of the proposed scheme of general water supply. As this scheme cannot be brought into working order as soon as the Troops can be accommodated on the Race Course, and the rapid completion of this latter change is highly desirable for Military reasons.
Provost yard.		22. In paragraph 62 of the Bangalore Report, the ventilation of the Provost yard was said to have been reported as satisfactory. The Secretary to the Sanitary Commission direct attention to the inaccuracy of the Statement, which was inserted in the Report on the authority of an Officer of experience, who communicated on the subject with the Sanitary Commission. Doctor Montgomery directed attention to the fact that the granite floors of these cells are on a level with the ground of the enclosed Court yard, and that there is no floor ventilation. This Committee having carefully examined the cells, concur in these objections and recommend that the Court yard should be lowered from 6 to 12

Subject.	<i>Recommendations of President of Sanitary Committee. New Barracks on the</i>	<i>Observations of this Committee.</i>
	<i>Race Course, &c.—(Continued.)</i> inches, and the flooring of the cells should be raised one foot, also that ventilation openings should be pierced in the rear walls of all cells, and that a perforated ventilating plate should be placed in each lower panel of the cell doors. The Committee also disapprove of the Latrine and Lavatory arrangements which are exceedingly defective.	
Family Quarters ill constructed.		23. The Committee feel bound to direct attention to the exceedingly small dimensions of the family Quarters, and to their being constructed of brick in mud instead of Brick in Chunam. The usual consequence has resulted. All these quarters are infested with white ants and will soon be completely over run with them.
	<i>Old Dragoon Barracks.</i>	
Capacity of Barracks.	1. That at the standard of 85 square feet, only 48 men, exclusive of Serjeants, be accommodated in each of the old Dragoon Barracks.	24. On the principle adopted in regard to the new Barracks on the Race Course, this Committee recommend for adoption the standard 85 square feet superficial space per Cot. The accommodation of six and five Cots respectively in the Verandah day rooms Nos. 1 and 7 is recommended by this Committee. Thus 48 men would be accommodated in Barrack rooms Nos. 2, 5 and 8, and 11 men in the two day rooms or 59 men in each Block or 472 men in the eight Blocks now erected. Thus leaving nearly 300 unmarried men to be provided for in new buildings.
Site for new Barracks.	2. That the additional Barrack accommodation needed for a full Infantry Regiment be provided by the erection of additional Barracks. 3. That each Barrack be sub-divided into three compartments, as shown in Plan, and that the better lighting of the Barracks be enforced.	25. These new Barracks should face the prevailing winds, and would therefore be below and at right angles, with the present Barrack Blocks.
Latrine accommodation for families.	4. That suitable Latrine accommodation be provided for the families of married Serjeants in Barracks. 5. That the Lavatories and Urinals for men be cleaned separately, and that dry earth conservancy be adopted in both Urinals and Latrines.	26. The sub-division of the Barrack Blocks should, in our opinion, be deferred until the two Blocks of family quarters noted below are removed. When this is done, sub-division should be tried experimentally in two Blocks, say Nos. 2 and 3. This cautious course of action is recommended, as these Barracks do not face the prevailing winds as do those on the Race Course and the Horse Artillery Barracks. The central Verandah should be well lighted at night, as proposed in the Race Course and Artillery Barracks.
		27. Approved. But arrangements must be made also for cooking for these families.
Wash-houses.	6. That the Wash-houses be improved so as to secure more privacy to persons bathing.	Approved.
Building to be removed.	7. That the two Blocks of family quarters now existing between the end of the Barracks and the public road be removed, and a low wall erected as a Barrack enclosure,	28. Approved.
		29. This can only be done as soon as other family quarters can be provided. This should be done with as little delay as possible.

Subject.	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
Guard-room.	<i>Old Dragoon Barracks, &c.—(Continued.)</i> 8. That the furniture of the Guard-room be improved, so as to promote the comfort of the men on duty, and that the Privy attached to the Guard-room be adapted to the dry earth system.	30. Adapted.
General Military Prison.	9. That a General Military prison be built at Bangalore.	31. This is highly approved. It is understood that this has been already sanctioned by His Excellency the Commander-in-Chief.
Wash-houses for women and children.	10. That Wash-houses be built for women close to each Block of family quarters.	32. This suggestion is adopted as a desirable improvement. The Committee observe that if it be acted upon, the Female Wash-house at present in use can be made into a good School room for which its situation is well suited.
Alteration required if made into a School.	11. That the proposed new water supply for these Barracks should be as soon as possible effected.	33. It would be necessary, however, that such alterations and additions to it as are required should be made.
Water supply.	12. That the beds and bedding be improved as recommended by this Commission.	34. Approved.
Cots and Bedding.	13. That the Hospitals for males and females be no longer used for this purpose, and that they be converted into Recreation and School-rooms for the European Infantry Regt.	35. The Committee consider that the present Cots and bedding are unsatisfactory, and they trust that early orders on this subject may be received from the Supreme Government.
Hospital.	14. That the Sick be treated in one Genl. European Hospital to be erected on the Race Course	36. This Committee having, for the reasons before stated, concurred with the Commander-in-Chief, that the erection of a General European Hospital was open to objection on account of the distance of the proposed site for it from these Barracks, carefully examined the old Dragoon Hospital and unanimously condemned it.
Newly erected Cook-house.		They trust that as the situation is open to some objection, (and no other is available) His Excellency will be pleased to recommend to Government that a new Upper storied Hospital may be constructed.
Capacity of Royal Horse Artillery Barracks.	<i>Horse and Foot Artillery Barracks.</i> 1. That the standard of 85 square feet superficial area should be adopted for all men, exclusive of Serjeants, to be accommodated in the Barracks.	37. The Committee desire to direct attention to the very faulty design and construction of the new Cook-house recently erected at the old Dragoon Barracks. The apartment is deficient in space, has no means afforded for hanging up culinary articles. There are no chopping tables placed close to the walls and no suitable culinary appliances are provided.
Additional accommodation required.	2. That additional Barrack accommodation should be provided at the same rate for such men as may require it, the number to be thus provided for to be fixed by the Military Authorities.	A much larger building better ventilated and with good flooring, and well raised above the surrounding ground should be provided, and a good Verandah should surround the building.
		38. Adopting the same principles as before, we recommend that 48 men should be accommodated in three central rooms Nos. 2, 5 and 8 of Sanitary Commission ground Plan, and seven and three men in the two day rooms, Nos. 1 and 7 respectively, each Barrack Block would contain 58 men or 116 in two Blocks.
		39. Approved. This will be required for men of the Horse Battery not provided for in last proposal.

Subject.	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
<i>Horse and Foot Artillery Barracks, &c.—(Continued.)</i>		
Drainage.	3. That the drainage of the Barrack Blocks and especially of the Sergeants' quarters therein, should be at once improved.	40. Approved.
Saddlery and Harness.	4. That all Saddlery and Harness should be, as soon as possible, removed from Barrack rooms or Verandahs, and that suitable apartments for the safe custody of these should be provided either in detached buildings or in the Stables recommended by this Commission, should these latter be approved by Government.	41. Approved. That Saddlery and Harness be kept in "detached buildings or Stables," leaving the nature of these to be fixed hereafter.
Lavatories to be improved.	6. That the present Lavatories be removed and suitable ones erected, each to contain, in separate rooms, fixed baths and Basins respectively.	42. The <i>immediate</i> adoption of this measure for both Horse and Foot Artillery is strongly recommended, and the erection of suitable Lavatories should be at once commenced. The Officer Commanding the Division has been requested to bring this to the notice of Government. The plans for these buildings should be submitted to His Excellency the Commander-in-Chief.
Cook-rooms and Privies.	7. That new Cook-rooms and Privies be erected, that they both be well ventilated, and that the latter be so constructed as to be worked strictly on the dry earth principle.	43. Approved. The Committee observe that cooking Ranges are sanctioned for the Horse Battery and Foot Artillery Barracks, and they recommend that only one building be erected for the Horse Artillery Barracks, and that it be placed centrally behind the present Orderly room. The recommendation regarding Privies is approved, and the early erection of these is highly desirable for both Horse Battery and Foot Artillery.
Foot Artillery Barracks.		44. The Committee consider it sufficient to place on record the fact that the Barracks in which the A Battery 23rd Brigade are quartered, have been long since condemned as unsuitable, and that their removal to another position is intended, but has been frustrated by the sending to Bangalore of a 3rd Battery of Artillery. The necessity for removing the men to Barracks in a better locality still exists, and measures should be adopted as soon as possible to effect this.
Hospital.	8. That the present Hospitals for Artillery, when no longer required for their present use, be converted into Recreation rooms and Workshops.	45. Approved.
Stables.	9. That suitable stabling be erected for all Horses.	46. Until the decision of Government is known, it would be better to substitute "cover" for "stables."
School-rooms.	10. That new and improved School rooms be erected in closer proximity to the married quarters.	47. The Committee consider the present School-rooms are insufficient, but they do not approve of any alteration in the present site.

<i>Subject.</i>	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
<i>Horse and Foot Artillery Barracks, &c.—(Continued.)</i>		
Plunge Bath.	11. That a good Plunge Bath be constructed.	48. Approved.
<i>Main Guard.</i>		
Main Guard.	349. That two Privies should be re-constructed and worked carefully on the dry earth system.	49. Approved.
<i>Old Barracks and Hospitals of European Regiment.</i>		
Old Barracks of European Regt.	1. That these Barracks be converted into Arsenal and Commissariat Stores.	50. The propriety of the recommendations of the Sanitary Commission cannot be at present decided upon.
European Infantry Hospital.	2. That the Hospital, when no longer required by the Infantry Regiment, be converted into a Garrison Hospital.	
<i>Garrison Hospital.</i>		
Garrison Hospital	350. That this building be abandoned.	51. The Committee coincide in the recommendation of the Sanitary Commission.
<i>Sappers and Miners.</i>		
Huts to be removed.	1. That the huts at the Southern angle be removed.	52. This is desirable and has been already sanctioned.
Drainage.	2. That the drainage of this place should be diverted from its present course.	53. This should be attended to.
Conservancy.	3. That the conservancy of the hutting ground be promoted by enforcing a complete system of conservancy in the Native houses lying to the west of it.	54. It is desirable that the conservancy of this space should be strictly attended to.
Permanent Lines recommended.	4. That permanent Lines be erected by the Corps of Sappers and Miners.	55. The Committee observe that this question has already been decided by this Government regarding Native Lines generally, and as regards these Lines in particular.
Over-crowding of family quarters	5. That here and elsewhere over crowding of public quarters by private families should be strictly prevented.	56. The Committee strongly approve of this suggestion.
Construction of out-houses of family quarters.	6. That the out-houses of the proposed family quarters should be thrown to the back of the enclosed compound and not be built contiguous.	57. This has been already done, on the recommendation of the Sanitary Commission.
School-rooms.	7. That the School rooms should be improved as it is suggested, the Barrack Quarters are to be.	58. This has been already done, on the recommendation of the Sanitary Commission.
Hospital.	8. That the Europeans of the Sappers and Miners be treated in a General Military Hospital at Bangalore, if such an Institution is sanctioned.	59. The question of the Hospital accommodation for this Corps is referred to the Military and Medical Authorities of the Division.

<i>Subject.</i>	<i>Recommendations of President of Sanitary Commission.</i>	<i>Observations of this Committee.</i>
	<i>Sappers and Miners, &c.—(Continued.)</i>	
Delapidated buildings.	9. That the private dwelling house existing in these Lines should be at once removed.	60. This has been already done.
Soldiers' Club.		61. The Committee consider that a Soldiers' Club is not needed at Bangalore, as the several Regiments are amply provided with Recreation and Reading-rooms. 62. The President intimates that the Committee is adjourned until further orders. The foregoing remarks are to be submitted to His Excellency the Commander-in-Chief. 63. The Members of the Committee will return to their proper duties.

BANGALORE, 27th May 1865.

APPENDIX A.

Bangalore, 18th May 1865, Thursday.

D. O.—By Major General F. P. HAINES, Commanding Mysore Division, Bangalore, 18th May 1865.

No. I.—Head Quarters Bangalore, 17th May 1865, General Orders by His Excellency the Commander-in-Chief.

A Committee composed as follows will assemble at such time and place as the President shall appoint, for the purpose of taking into consideration such matters as will be laid before it.

PRESIDENT.

Major General F. P. HAINES, Commanding Mysore Division.

MEMBERS.

Colonel R. KNOX, 18th Hussars.

Lieutenant Colonel R. CADELL, Royal Artillery.

Do. F. H. SCOTT, Quarter Master General.

Deputy Inspector General of Hospitals W. MACKENZIE.

Do. J. GORDON INGLIS.

Surgeon H. B. MONTGOMERY, Secretary to Sanitary Commission.

By Order,

(Signed) H. A. HARE, Major,
Military Secretary.

No. II.—The Committee detailed in the above Order by His Excellency the Commander-in-Chief, will meet tomorrow at 4 P. M., at the Officers' Guard Room, Race Course (new) Barracks.

By Order,

17th May 1865.

(Signed) R. H. BOLTON, Major,
Ag. Major of Brigade.

D. A. O.—The President and the Secretary of the Sanitary Commission, being at this station on duty, the Major General Commanding requests that every facility may be afforded to them by Commanding Officers and Heads of Departments, in their Inspection of Public buildings, lines, &c.

By Order,

(Signed) R. H. BOLTON, Major,
Ag. Major of Brigade.

APPENDIX B.

From the Officiating President Sanitary Commission, Bangalore, 19th May 1865 ; to the Officer Commanding Mysore Division.

President of Special Committee, convened by His Excellency the Commander-in-Chief, to consider the recommendations by the Sanitary Commission appertaining to the Military Station of Bangalore.

* *Pro. of Govt. P. W. D., No. 1275, dated 10th May.*

I have the honor to inform you that, in compliance with the Orders of Government,* I came to this Station to join the Committee therein constituted.

2. In a letter from the Military Secretary to His Excellency the Commander-in-Chief, I am informed that His Excellency was very desirous that you (I) should have formed one of the Committee, but your (my) rank precluded this ; Sir Hope Grant, however, requests you (I) will have the goodness to attend the Committee when your (my) services may be called for by the President and give to it the benefit of your (my) opinion.

3. I beg therefore to tender my services in any way that you may consider calculated to assist the labours of the Committee named by His Excellency.

4. To enable you to report conclusively on the several topics likely to come under discussion, I beg to place in your hands a copy of the Report on this station, recently submitted to Government by Honorable Mr. Ellis, as the result of Inspections instituted by him and Dr. Montgomery in October last.

5. I would suggest that the various recommendations in this Report be considered by your Committee, more especially as regards any of them which may be considered likely to interfere with Military strategy or discipline.

The recommendations are printed in extenso at pages 63 to 66 of Mr. Ellis' Report.

6. Should these recommendations receive the approval of the Committee, (composed as it is of Officers of the Military and Medical services both Imperial and Local, and presided over by an Officer possessed of long Indian experience) great additional weight will be given to them, and much good will result.

7. The requirements of this station, as regards Conservancy, Barrack accommodation, Hospitals, &c., are of special importance, in consequences of the large number of European Troops stationed there, its Geographical position, its known salubrity and its occasional use as a Sanitarium.

8. Your especial consideration is solicited to the immediate preparation of a Plan of drainage on a working scale from the Race Course buildings and their roof gutters, as urged in the report now forwarded, wherein attention is directed to the urgent want of a system of drainage on that locality. I would advise that the open drains terminate in a masonry conduit found with granite, to carry the foul-water well to Leeward of the Race Course, there to be distributed as is now done in England on Meadow Lands.

9. The drainage from Hospital compounds should be complete in itself and at their origin independent of any general system of drainage. A low thick hedge should surround the escape opening of the Sewer ; clumps and rows of trees being planted between this spot and the Hospitals and Barracks. The approach of the East wind should also be broken in a similar manner.

10. I would suggest the desirability of fully discussing the question of water supply and water distribution throughout the station. This subject was not examined in detail by Mr. Ellis, that gentleman being informed that a special scheme had been sanctioned by Government and was being rapidly carried out.

11. Another question requiring definite arrangement, is the early introduction of dry earth system of Conservancy throughout the station. The recommendations regarding this subject have

been approved by Government.* It would in my opinion be very desirable, with reference to paragraph† 6 of that Order, that advantage be taken of the presence of this Commission to arrange what alterations should be made in all Barrack Urinals and Latrines to carry out the proposed system.

12. Asphalte, similar to the asphalted flooring seen at Railway Stations, should be substituted for the present uneven granite flooring in the Barracks.

* *Order No. 1376, dated 10th April 1865.*

† *Pages 56 to 58 of accompanying Pamphlet by this Commission.*

13. The foundations of the Barracks on the Race Course are so low, and the arrangements for carrying off rain water from the roofs so exceedingly defective, that the foundations of these buildings are rendered damp after rain—all rain water from roofs should be conducted into reservoirs, there to be stored for use, in case of interruption to the Ulsoor water supply, and the reservoirs might be placed so as to be capable of affording water to the cisterns connected with the distribution pipes, supplying Barracks and Hospitals or for the use of swimming baths ordered.*

* *Pro. of Govt., Mily. Dept., No. 1807, dated 12th May 1865.*

14. All Barrack blocks, Hospitals and married Quarters should be surrounded with a granite pavement, out side which, a V shaped gutter, or side drain, should collect surface drainage.

15. All garden plots should be removed ten feet from Barrack and Hospital Verandahs, and the cultivation of flowers in all Verandahs should be interdicted.

16. With reference to paragraph 86 of Mr. Ellis' Report, I would draw your especial attention to the introduction of an improved style of Cook-house. These buildings should have :—

a. Glazed windows and doors with openings at the eaves and along the roof.
b. Surface drains should never be used for the discharge of Cook-house water, and cess-pits are quite inadmissible.

c. If an outlet cannot be obtained for the drainage, a discharge pipe should carry it from the sink to a moveable vessel, where it can temporarily remain.

d. Benches should be placed opposite to glazed windows, a fixed table and chopping block occupying the centre of the apartment.

e. A pantry provided with tables should be a separate building for preparing the men's food.

17. Further essential subsidiary buildings for the new Hospital on the Race Course are :—

a. Laundry, fitted with washing machine, and range of 4 Tubs for each Hospital with hot and cold water to let on.

b. A compartment for drying clothes by means of a current of hot air (introduced through the floor) which is made to play over the linen in its passage to the roof where it escapes. In this building there should also be a compartment for mangling and ironing and a small apartment for washing bandages.

c. A stable and shed attached for the Medical Officer's horses and conveyances.

d. An ambulance and hearse shed with stabling for the cattle.

e. A dead house, at one corner of the compound, with a door to open outside the enclosure.

18. The extent of all Hospital compounds should be immediately defined, marked out, and planted with ever-green trees. Such as those recommended by the Bengal Commission.

Pepal (*Ficus religiosa*.)

The Neem (*Azadirachta indica*.)

The Sissoo (*Dalbergia Sissoo*.)

The Mango (*Mangifera indica*), and others at a distance of 30 feet apart ; rows at double that distance being planted to within 80 yards of the building.

19. The lower branches of trees throughout the Cantonment, and all walls and hedge-rows, should be lowered to 4 feet, to admit of free perflation of air.

20. An Iron-rail or strong wire fence with iron gates should encircle Hospital compounds ; standards being fixed into granite blocks.

21. Grass should be planted over barren and sandy surfaces in proximity to Barrack buildings, and no uneven or sloppy place permitted.

22. There should be a granite edged walk 6 to 8 feet wide with stone-faced gutters beyond, along both sides of the roads throughout Cantonment.

23. In all ablution and Bath rooms, seats in the form of a deep recess with projecting plank below, should be constructed in the wall. Also shelves introduced near each tub for soap, &c. Pegs or fixed clothes horses are also indispensable in all Lavatories.

24. Some of the above recommendations may appear to you as minor matters of detail with which your Committee is unable to deal. But they are essential points, both to the comfort and health of the garrison, and as such deserving your consideration.



SUGGESTED

C
FOR ARTICLE

Page of 100

Page of 100

APPENDIX C.

Proceedings of Medical Sub-Committee, May 22, 1865.

PRESENT.

Acting Inspector General, W. MACKENZIE, M. D., C. B.

Deputy Inspector General, J. G. INGLIS, M. D., C. B.

Surgeon, H. B. MONTGOMERY, M. D.

REPORT.

1. With reference to paragraph 16 of the foregoing Proceedings, the Sub-Committee beg to report that they agree with the Sanitary Commission, that as a rule the occupation of upper floors only of Hospitals should be insisted upon. But, taking into consideration the admirable site for the proposed Hospital on the Race Course, and the fact that the foundations now partially laid at a cost of about 6,000 Rupees can be utilized for the plan proposed in Appendix E of the Bangalore Report, the Sub-Committee do not press as essentially necessary the erection of an Hospital on Colonel Crommelin's plan, as modified by the Sanitary Commission.

2. The Sub-Committee therefore recommend, that the attention of Government should be directed to the propriety of modifying the Hospital now being erected on the Race Course.

3. They have therefore carefully considered the improvements suggested in the letter No. 531, of the President Sanitary Commission (Appendix E of the Bangalore Report) and approve generally of the suggestions contained therein.

Before noticing these in detail, it is necessary to observe, that however desirable it might be to adopt Colonel Crommelin's plan, and to place all executive apartments in the lower floor of the proposed Hospital, yet on the available site although ample space is in existence, the lie of the ground would not allow of a *very long* continuous building being erected on this ground, and it is highly desirable that there should be no further change in this site.

4. For the foregoing reason, the Sub-Committee advocate that Apothecaries, Hospital Serjeants, Executive apartments (Surgery, Operating Room, Receiving Room, &c.,) should be placed in one storied buildings as shown in plan appended to this letter.

5. To secure the entire avoidance of evil smells from the Latrines, the Sub-Committee recommend that the original plan of the site of the Latrines, be in part adopted to, and that the arrangement and construction of these should be those proposed by the Sanitary Commission, the position only being altered.

6. This will somewhat alter the detailed arrangement of the separate wards, but all seclusion for them can be secured by a slight alteration in the direction of the colonnade connecting the Executive rooms with the two wings of the Hospital.

7. The Sub-Committee venture to suggest that, in lieu of putting Apothecaries in the upper floor of the Executive apartments, the Apothecaries should be accommodated in Quarters contiguous to, and resembling those of the Hospital Serjeants, as proposed by the Public Works Department.

This suggestion is made in consequence of the probability of the Apothecaries' families being less comfortable upstairs than downstairs; and the desirability of not multiplying upstairs buildings unnecessarily.

8. The Female Hospital should consist of two wards 50×24 each, thus affording 120 square feet superficial to 10 Patients each, and they recommend that there should be two special wards at one end; and that the two similar apartments separating the two special from the General Wards should be given up for the occupation of the Hospital Nurse. The building need not be upper-storied.

9. The site of the Female Hospital is of necessity now different from that originally proposed. It must now be placed to the front and west of the men's Hospital. The Latrine, therefore, should be placed on the western side of the Female Hospital.

With these exceptions the recommendations of the Sanitary Commission are approved.

10. The Sub-Committee bring prominently to notice the urgent necessity of enclosing a sufficient space of ground round these Hospitals, and of a similar separation between the Male and Female Hospitals. A low dwarf wall with railing would be the best protection.

11. The "separate wards," cook-rooms and Cart shed and Dead House, advocated by the Sanitary Commission are essential to the perfection of this Hospital, and should be placed as designed by them.

12. The Sub-Committee suggest that it be referred to the Divisional Authorities to decide whether or not Quarters should be erected for the Medical Officer.

This building, if required, should be to windward and eastward of the Hospital front, but should not form an integral portion of the Hospital, such arrangement being only required, had a General Hospital been in contemplation.

13. In conclusion, we submit a ground plan of the Buildings arranged as proposed in this letter, and we may state that more than half of the foundations now laid can be utilized as they now stand. The foundations of only one Pavilion have been laid.

APPENDIX D.

From the Secretary Sanitary Commission, Madras, 29th May 1865, No 65; to the Executive Engineer, Bangalore.

I have the honor to inform you, that at the request of the Committee recently assembled at Bangalore, I have to submit for your consideration the following suggestions, regarding the means to be adopted with a view to the introduction of the dry earth system of Conservancy, in the present Latrines and Urinals on the Race Course at Bangalore.

2. The suggestions have been submitted to and approved by this Commission. This course has been adopted to enable you to estimate for the necessary alterations without delay, as they are approved by the Major General Commanding the Division.

3. In the subsequent portion of this letter, you will find certain other recommendations made regarding Cook-houses, Family Quarters, &c., to which your attention is solicited. The recommendations, originating with this Commission, have been recently approved by the Special Committee convened on 17th current, by order of His Excellency the late Commander-in-Chief Sir J. Hope Grant, G. C. B.

Present and proposed Privies.

4. The double Privies for men and women attached to the Barracks and those more recently designed for the Barracks, can be very easily adapted to the new system of Conservancy. They are at present worked on the Punjab system

partially, but no air tight receptacles are provided for storing excreta, nor are the sweepers constantly in attendance. The vessels are some inches below the seat and the whole place is highly offensive from decomposing excreta.

5. The thickness of the rear wall (18 inches), and the lowness of the arched opening through which the vessel to hold excreta must be passed, are both sources of difficulty in carrying out the careful and constant removal of the vessels when they have been used.

6. The brick and chunam partitions between the closet seats are also objectionable, and occupy unnecessary space.

7. This Commission suggests that three arches should be opened in the back-wall, the crown of each arch to be under one of the three windows, the arch to be 6-4 in width, and to spring at the height of 6 feet from the ground. The three recesses thus made, should be made to hold three compartments 2 feet wide and separated by sheet iron partitions. Thus nine seats would be provided for each Barrack, which will henceforward only contain 80 men, who would thus have Latrine accommodation at the rate of 11½ per cent. The back of the three arch ways should be of sheet iron, rising to a height of 7 feet from the ground. The seats should be of granite and the pans should be made with a projecting wire to slide in an iron groove, so as to come up in close contact with the under surface of the seat.

8. All iron work in Latrines should be in the first instance painted with Coal tar, and subsequently with zinc paint, which does not become discoloured by exposure to the fumes of Sulphuretted Hydrogen.

9. The seats should be 21 inches from the ground on which the men stand, and this should be raised six inches from the general level of the floor of the apartment.

10. The rear wall should be raised to a height of 8 feet and terrace-roofed, to form a Cart and dry earth shed, and two glazed windows should be pierced in it. The present entrance should also be furnished with a window. All these windows should have ventilating panes in the upper portion of them, there should also be ground ventilation below and tubular ventilation above.

At the outer end of this rear passage, which would be thus converted into a well lighted, well ventilated room : a double folding door to open outwards should allow of a Cart being backed on under cover, and the doors being then closed from without. A wicket being left for the entrance and exit of the sweeper, for whom also (if necessary) a small apartment might be built, say $10' \times 10' \times 8'$ in height, at the rear of the middle point of the building.

11. Thus the double building containing 18 seats, sufficient for two Barrack Blocks could be attended to by one man, and worked by Carts, which would bring dry earth and remove poudrette. Receptacles for earth should be provided. If two iron receptacles be allowed for each Cart, the earthen vessel could be re-placed by that in which poudrette had been allowed to accumulate.

Privy for Serjeants' Mess.

12. This building will require a good deal of alteration. From front to rear it measures $21\frac{1}{2}$ feet. The centre wall should be removed and a passage 7 feet wide should be left down the centre. At one end the Cart could be introduced, and at the other a large window should be made and tubular ventilation be afforded. The present roof will probably have to be removed or it might be possible to retain all except the centre of it, and to support it by strong masonry pillars three feet from the centre of the building on each side. The two rows of seats would then be erected on the same principles as proposed for the Barrack Privies, all partitions, &c., being made of corrugated or sheet iron. The partitions separating adjoining seats should be two feet clear apart and 3 feet in depth, the present depth of 5 feet is quite unnecessary.

Privy for Library.

13. This building should be altered on the same plan as is set forth in detail in paragraphs 4 to 11.

Wash-houses.

14. The large rooms built in blocks of two measure 28×14 feet, and are only furnished with a coarse granite slab along in the rear wall to hold the men's basins. Two or three tubs are also placed in these apartments, and they are lighted by a large window (5×3 feet at their end.) They are comfortless in the extreme and there is no possibility of decency being observed if persons are bathing. There are no pegs or racks on which to suspend clothing or bathing towels, and the mode of supply of water by hand labor in chatties brought from outside, where water is brought in Casks on country Carts, is clumsy, uncleanly and tedious. The flooring of granite slabs allows percolation and keeps the place damp.

15. To remedy these serious defects it is desirable.

(1.) That each present Wash-house should be divided into two rooms each 14×14 and having one door and one window each.

(2.) That one of these rooms should have a series of fixed basins, with plugs and over each basin a "bib cock" to supply water from a cistern outside the building, this cistern to be hand filled for the present, but to be eventually supplied from the main of the proposed water supply.

(3.) That the other room be provided with 4 fixed baths of granite bonded with hydraulic cement, and a shower bath which could be filled by the men who require to use it, means being provided for supplying it with water by the ordinary hand pump which will raise water from the tub at the bottom through one of the supports of the top compartment.

(4.) That the water from the Latrines be discharged through open V shaped granite channels, and that the part of these passing through the Urinal be carefully covered in.

(5.) That no open communication whatever be allowed between the Wash-house and the adjoining Urinal.

(6.) That the fixed baths and shower bath be furnished with curtains or screens of canvass, painted with coal tar and afterwards with zinc paint or in the first instance "burnettised."

(7.) That asphalte flooring well laid and properly sloped be substituted for the granite slabs now in use.

16. The basins should be of brass, or what is better, and requires less cleaning, of good well glazed ware with plugs of brass.

17. Each basin should be supplied with a discharge pipe to lead water into a well sloped channel, from whence it would rapidly find its way into the open granite sewer.

18. All Wash-houses, both basin and bath rooms should have pegs to hang clothes on, and the basins should be of good size and sufficient in number. Two or three feet basins on the level of the ground, and 20 basins for 80 men should be provided—the basins to be of a good size and immovably fixed on a granite slab.

19. A small Wash-house should, in the opinion of this Commission, to be provided for women and children close to the Family quarters.

Urinals.

20. The plan of the Wash-house and Urinal shows that the double Urinal attached to each Wash-house, comprises 4 compartments when men pass water into a channel flushed by the Lavatory. This is entirely objectionable. The double Urinal should be thrown into one apartment furnished with compartments 3 feet deep and 2 feet wide. In these compartments iron vessels 2'-6" high and 18 to 24 inches in diameter should be placed and $\frac{3}{4}$ filled with dry earth. These vessels should be cleaned out and refitted with earth morning and evening, and one similar vessel should be placed in one Verandah of each Barrack room for use during the night if required.

Cook-house.

21. This building should have the present masonry tile work openings re-placed by glazed windows.

Family Quarters.

22. I am instructed by this Commission to direct your attention to the entirely insufficient dimensions of the present family Quarters, and their strong recommendation, that all future Quarters should measure 16 × 14 and 14 × 10.

23. I am also to direct your attention to the desirability of altering the site proposed for the School-room. It is placed to Leeward of the Privies attached to the Serjeants' Mess, and this is objectionable. It might with great advantage be thrown back behind the Family Quarters, where it would be better ventilated and not itself prevent the ventilation of other buildings.

N. B.—The undermentioned Plans are herewith returned.

Plan and Section of a Wash-house and Urinary for new Dragoon Barracks on the Race Course.

Plan and Section of 15 married men's Quarters in one block for the new Barracks on the Race Course.

Plan and Section of Privies for the new Dragoon Barracks on the Race Course.

Plan and Section of a Privy for Library, attached to the new Dragoon Barracks on the Race Course,

Plan and Section of a Privy for the new Dragoon Barracks on the Race Course.

Plan and Section of a Privy for the Serjeants' Mess attached to the new Dragoon Barracks on the Race Course.

Design for a Provost yard, &c., at the new Dragoon Barracks on the Race Course.

From the Quarter Master General, Head Quarters, Ootacamund, 1st July 1865,
No. $\frac{124}{6844}$; to the Secretary to Government, Military Department, Fort Saint George.

With reference to paragraph 15 of my letter, No. 48, dated 14th ultimo, I have the honor, by order of His Excellency the Commander-in-Chief, to forward the accompanying Report from the Officer Commanding Mysore Division, on the Lines of the Native Infantry Regiments at Bangalore, referred to at page 65, of the Sanitary Commission's Report on that Station.

2. On items Nos. 1, 2 and 3, the Commander in-Chief has nothing to observe, as Government has already decided on, or negatived, the propositions.

3. On item No. 10, the Bangalore Committee has already sent in its Report under this head.

4. The Commander-in-Chief's remarks on each heading of General Haines' Report, are entered in the margin of the same.

From the Officer Commanding Mysore Division, Head Quarters, Bangalore, 28th June 1865, No. 211; to the Quarter Master General, Head Quarters.

I have the honor to submit, for the consideration of His Excellency the Commander-in-Chief, the detailed Report under reference in your letter, No. 51 of the 14th June 1865.

Sanction for the construction of this work, and the allotment of Funds, is again solicited.

The deficiency of water has never been spontaneously reported by the Officers Commanding the Regiments, and the want cannot therefore have been of very urgent nature. In the 33rd Lines, the difficulty seems to have been removed. In the 22nd Lines, the Government Well might be deepened, if the expense of digging another is objected to.

The cultivation recommended here may be permitted, provided it does not interfere with the immediate resumption of the ground for Military purposes, if required.

This measure has been anticipated by the Divisional Authorities.

Concurred in.

4.

New Staff Serjeants' Quarters are undoubtedly desirable for the 33rd Regiment; the necessity for their construction has been already admitted, and they were entered in the Budget for 1865-66, but the Executive Engineer reports, that "as no allotment has been sanctioned, he concludes the item was omitted in the final Budget for the year." Revised Plans and Estimates are now under preparation.

5.

The two Government Wells in the Lines of the 33rd Regiment are nearly dry, and I have ordered them to be cleaned out, the Officer Commanding reports, that there would have been a deficiency, but for the Wells lately sunk in the Sepoys' Gardens, wherein a plentiful supply was obtained.

There is one Government Well in the 22nd Lines, affording a good supply of water, but I think that another might be sunk with advantage to the men of this Regiment. The Commanding Officer reports that a deficiency was felt during the recent dry season, in consequence of there being but one Well; but in both cases the deficiency was not brought to the notice of the Authorities, until I asked the question, on receipt of your letter under acknowledgment.

6.

A great part of the Lines of the late 14th Regiment are occupied by the Sappers, as a temporary measure. Another part has been selected for the site of a new Civil Hospital. It is therefore impossible at present to carry out the suggestions of the Sanitary Commission, as regards putting them under cultivation; but I see no reason why this measure should not be carried out, so soon as the Sappers shall occupy their own Lines, which, however, are not yet commenced.

7.

The Hospital of the late 14th Regiment, being furnished with superior accommodation, was made over to the 22nd Regiment on the departure of the former Corps, at the recommendation of the Deputy Inspector General of Hospitals of the Division.

8.

To remove the bazaar cross blocks, which run at right angles to the main streets of the 22nd Lines, would be attended with very considerable expense, as well as difficulty, and though the Lines would be benefitted by the arrangement, I am of opinion, that the advantage attained would be inadequate to the outlay.

Approved.

Nothing appears really necessary to be done to these buildings.

Concurred in.

Concurred in.

A Police Peon placed over this nullah would meet the difficulty.

(Signed) F. H. Scott, Lt.-Col.,
Quarter Master General.

From the Officiating President Sanitary Commission, Madras, 8th July 1865, No. 237; to the Secretary to Government, Military Department, Fort Saint George.

In returning the Proceedings of the Bangalore Committee* convened, under orders from His Excellency the Com-

* Received with your endorsement, dated
1st July.

† Under date 17th May 1865.

9.

The Latrines were constructed solely for the use of the men on duty at the Native Infantry Barracks, and one Toty has been sanctioned to keep them clean; but a promiscuous use of them, which it was found difficult to stop, has sometimes rendered them offensive, I have therefore desired the Executive Engineer to furnish the entrances to them with a door and lock, and I believe that this measure will free them from all objections.

11.

The Executive Engineer reports that the masonry pillars might possibly be removed, but with great risk to the roofs, and strongly urges, that their removal may not be attempted. As regards accommodation in these Hospitals, I annex an Extract from a Report made by the Officiating Deputy Inspector General of Hospitals upon them.

"The 22nd Native Infantry Hospital
"has accommodation for twenty-three sick, ample
"for the average under treatment, viz., 12.5 in
"1860 to 1864.

"The 33rd Native Infantry Hospital
"has accommodation for twenty-three sick, which
"is sufficient for the average sick, viz., twenty-
"five in the five years 1860-64, and 1860 and 1861
"were exceptional years, the average being 33.5
"and 48.2 respectively."

12.

I approve the measure suggested by the Sanitary Commission in this instance, viz., the conversion of the 22nd Hospital into Apothecaries' Quarter for the two Native Regiments.

13.

I think it most desirable, that a dead house, and strictly separate ward, (detached from the main building) should be constructed for each Native Infantry Hospital.

14.

To fill up the nullah near the 14th Hospital is merely a question of expense. The only objection to it, (that I can perceive) is the shelter it affords to Natives to squat there. Doubtless a covered drain would be an advantage, but the same remark would apply to many similar conditions of circumstances with equal or greater force.

commander-in-Chief,† to report upon certain Sanitary recommendations made by this Commission as to the construction of

buildings, &c., at Bangalore, I beg to observe, that having carefully gone over these papers, this Commission is gratified to observe a general concord of opinion in both Reports. It remains, therefore, for me only to make a few remarks on points of detail.

2. At paragraph 6 of the Report by the Committee, the difficult subject of drainage is adverted to, with reference to the removal of surface sewage water from main and out buildings, we recommend that all rain-water not conserved for domestic purposes, and waste water from buildings should pass from the surface through grated openings into glazed stone-ware branch pipes laid on to a main conduit, by which the water would be conveyed to a distance from the Barracks.

3. At paragraph 8 of the Bangalore Committee Report, a modification of the Sanitary Commission's suggestion regarding Recreation-rooms is approved of experimentally—it being decided that the end portions of the front enclosed verandah might be used as dormitories.

4. But, in the opinion of this Commission, it would be a measure very hazardous to the health of the men to adopt the Quarter Master General's recommendation now notified in the 5th paragraph of

** Returned herewith.*

his letter, * attached to these Proceedings, as His Excellency the Commander-in-Chief

dissents from the decision on this point, because it curtails the space for dormitories.

5. This Commission is very desirous to meet the expressed wishes of His Excellency Sir Gaspard LeMerchant, especially as they believe that the same sentiments were entertained by the late Commander-in-Chief.

6. I should, however, state that it was purposely to prevent the conversion of those inner verandahs into dormitories that induced this Commission to urge their utilization as advised.

7. It is a standing principle that no building under one roof is to give cover to more than two rows of beds.

8. Enclosed verandahs attached to dormitories, even with the best adaptation of clerestory openings, retard the free ventilation so essential in apartments, where large bodies of men reside day and night, for the currents of heated air instead of escaping at the openings in the upper walls of these double verandahs, are wafted into the interior or body of the building to escape at the more elevated openings there, thus rendering the air of the central apartment impure.

9. Finally, on the subject of water supply, we beg to urge that as the Ulsoor tank is to be the great source of supply, indeed, I may say, the only one for the European Force at Bangalore, too much attention cannot be paid to the impounding of water flowing into this reservoir. From personal examination, I am satisfied that much sewage still finds its way into this basin, and also that the area of the water shed by which the lake is replenished requires to be strictly conserved, embanked, and enclosed. All surface inequalities should be levelled; and the ground sloped to the water. The main channel of supply should be formed of masonry, and an iron grating should be placed within this channel, parallel to the enclosed and conserved area, advantage should also be taken when the water becomes low to deepen the bed of the tank, for water spread out over a great area with a shallow depth is likely to evaporate more rapidly, and becomes highly impure from vegetation which springs rapidly up on any portion of ground that is exposed, in consequence of the recession of the water.

From the Quarter Master General, Head Quarters, Ootacamund, 20th July 1865,
No. ²²⁶/₇₄₃₉; to the Secretary to Government, Military Department.

In Proceedings of Government, No. 2554, dated 11th instant, the Commander-in-Chief is requested to favor Government, with his remarks on a Minute by His Excellency the President, proposing such a new distribution of the buildings on the old Race Course at Bangalore, as shall suffice for the accommodation of a Regiment of Dragoons, and of two instead of one Battery of Field Artillery.

2. The Commander-in-Chief understands Sir W. Denison's propositions to be as follows :—

I. To move the British Cavalry and two Field Batteries of Artillery, into the new Barracks on the old Race Course ; this accommodation to be supplemented by the building now occupied as Serjeants' Mess room and Recreation room, for that purpose.

II. To remove the 10th Regiment into the vacated Cavalry Barracks, as soon as the requisite accommodation, beyond its present capacity for only eight Companies, can be completed.

III. To create the main water supply by "Roof drainage" into a series of tanks, leaving the pumping from the Ulsoor tank, as the subsidiary plan.

IV. To provide a fresh set of buildings for the Messes and Recreation rooms of the Serjeants of Artillery and Cavalry, whose present accommodation will have been absorbed into the new Cavalry Barracks.

V. To appropriate the vacated Barracks and buildings of the Field Batteries of Artillery, for the Ordnance Department, with the addition of two new Magazines, Stores and a walled defence from the Arsenal.

VI. To convert the vacated Infantry Barracks into accommodation for the Commissariat Department, with such additions as may be requisite.

VII. To provide a new Hospital.

VIII. To construct a new Prison.

3. His Excellency entirely concurs in these views of the Governor, and would only suggest, that they should be carried out in the rotation in which they are named above, and undertaken with as little delay as possible.

4. On the question of the "water supply," His Excellency concurs with the more confidence in the views expressed by Sir W. Denison, after his long practical experience at Malta, where the whole population as well as the Garrison, are exclusively supplied by the tank system : the advantages of which have been fully proved and recognized.

ORDER, No. 2894, 7th August 1865.

The foregoing papers will be communicated to the Department Public Works,

No. 2554, 11th July 1865.

with advertence to His Excellency the Governor's Minute recorded in Proceedings of Government, marginally noted.

2. In that Minute the principal points referred to in the correspondence above recorded have been provided for, leaving minor details in connection therewith to be disposed of on the plans and estimates for each work being submitted to Government.

3. No further orders appear to be required beyond directing the attention of the Department Public Works, to the request of His Excellency the Commander-in-

Chief, in regard to the order in which the works are to be undertaken, as stated in paragraph 3 of the Quarter Master General's letter No. $\frac{226}{7439}$, above recorded ; immediate attention, however, being required to the roof drainage of the buildings now in progress on the Race Course, and the alteration to the Prison accommodation adverted to in the papers attached to the Quarter Master General's letter No. 3/6301, 10th June 1865.

4. Referring to the Quarter Master General's letter No. $\frac{124}{6844}$, the Governor in Council concurs in the remarks by the Commander-in-Chief, on the letter from the Officer Commanding Mysore Division, the various points therein adverted to affecting buildings, &c., will be considered in the Department Public Works ; and the letter from the President of the Sanitary Commission, No. 237, dated 8th July 1865, above recorded, will also receive attention in that Department.

(True Extract.)

Under Secretary to Government.

To the President Sanitary Commission, with
Proceedings No. 2554 of 11th July 1865.

„ Quarter Master General, with 3 enclosures.	
„ Public Works Department.	
„ Adjutant General,.....	} for information.
„ Controller of Military Accounts,.....	
„ Principal Inspector General Medical Department, with Pro. No. 2554 of 1865.	

Exd. J. E. Cashart.

Proceedings of the Madras Government, Military Department.

No. 211. Read the following papers :—

Minute by His Excellency the President.

BANGALORE.

I had no idea that the Cantonment arrangements of Bangalore were in such an unsatisfactory condition, till the state of the Barracks in the old race course was brought under my attention a few months ago :—Indeed, till I came here, and went over the whole of the Military Establishments, I was not in any way aware of the amount of work remaining to be done, before the European Troops of this Division of the Army could be properly accommodated.

I believe that the Members of Council are as ignorant as I was of the amount of the liabilities, which the Government is in some manner pledged to meet ; and I shall, therefore, I think, do well in bringing the existing and the prospective state of things under the notice of the Government.

Bangalore is the Head Quarters of the Mysore Division of the Army. The Troops quartered there consist of—

- 1 Regiment of British Cavalry,
- 2 Batteries of Horse Artillery,
- 2 Field Batteries of Artillery,
- The Head Quarters of the Sappers, averaging from two to three Companies,
- 1 Regiment of British Infantry,
- 2 Regiments of Native Infantry,

of these one Battery of Horse Artillery, composed of Natives, is being gradually absorbed, and the probable complement of Artillery will be three Batteries, 18 Guns.

The Regiment of British Cavalry at present occupies a very commodious range of Barracks by the side of the Parade-ground, and all the buildings connected with these Barracks, with the single exception of the Hospital, are in a satisfactory condition—it is however in contemplation to move the Cavalry to a new set of Barracks which have been under construction since 1858, and which are now approaching completion. The Horse Artillery Barracks are in good condition and require but little doing to them.

The Barracks for the two Field Batteries are in a bad state, and it is proposed to move both these Batteries to the new Barracks, which have been so long building, and to make such additions to them as will fit them for a Regiment of Cavalry and two Field Batteries of Artillery.

The Regiment of British Infantry now occupies a Barrack close to the present Cavalry Barrack, but the amount of accommodation for the Regiment is not sufficient, and its character is bad—it is therefore proposed to add such a number of buildings to the Cavalry Barrack as will make it capable of containing, without undue crowding, the whole of the Infantry Regiment.

The Sappers and Native Infantry Regiments, occupy a set of well established Lines.

The Arsenal, containing spare Stores, Arms, Ammunition, a Battery Train, &c., occupies some buildings in the Fort, at a distance of from two to two and a half miles from the centre of the Barracks. The buildings belong to the British Government, the Fort to the Rajah of Mysore. The distance of the Arsenal from the Troops is a great inconvenience ; a large Guard has to be detached for its protection ;

Proceedings of the Madras Government, Military Department.

and all the Stores and Ammunition required for the use of the Troops have to be carried, under escort, for a long distance—I do not say much as to the chance of an out-break which might furnish the Insurgents with Arms and Ammunition, because I do not think such an event likely to take place; but the position is such as to make a contingency of this kind a fair matter for consideration.

The Commissariat Stores are dotted about the Town, at such distances apart as to render their proper supervision a matter of impossibility. Under such circumstances as these, I have thought it desirable to go carefully into the consideration of the whole of the Military arrangement of the Cantonment. I have consulted General Haines, the Officers in Command of the different Regiments, the Inspector General of Artillery and the Officers in Command of the Batteries, Colonel Barrow, Deputy Inspector General of Ordnance, and the Assistant Commissary General stationed here, and they all approve of the following arrangements.

The Barracks on the old race course to be occupied by the European Cavalry Regiment and two Field Batteries of Artillery. A Hospital to be built on that ground to accommodate the sick of the Cavalry Regiment and the whole of the Artillery.

The present Cavalry Barracks to be handed over to the European Infantry Regiment, such alterations and additions to be made, as will make the accommodation sufficient for a Regiment of the present strength. The most expensive addition will be a new Hospital.

By these changes, the whole of the European Force will be accommodated in well constructed airy Barracks.

The Barracks now occupied by one of the Field Batteries will be transferred to the Ordnance Department, and fresh buildings will be erected on the ground adjoining, into which the whole of the Ordnance Stores will be moved. A couple of Magazines will be erected within the limits of the Arsenal for the Powder.

I may observe here that, as the buildings in the Fort belong to the British Government, and will be transferred to the Mysore Government when the change is made from one site to the other, we have a right to expect that some assistance should be given by that Government, towards the construction of the new Ordnance buildings.

The Barracks now occupied by the European Infantry Regiment will, it is believed, be more than adequate for the accommodation of the Commissariat Department.

The Troops and the whole of the Military Departments will, if this scheme be adopted, be concentrated within a reasonable distance from each other, each Department will have its Stores, Workshops, &c., under direct supervision and control.

I have, therefore, given to the Executive Engineer instructions (of which a copy is appended to this Minute) to submit, with as little delay as possible, a Statement of the works which will be required, in order to carry out the whole of these alterations, in order that, when they have received the approval of the Commander-in-Chief, they may be sanctioned by Government, and form the Standard Plan for the Cantonment, the details of which will be estimated for separately, the works being pushed on with all convenient speed.

I must, however, call the special attention of the Government to one very important subject, namely, the supply of water to all these Establishments.

The position of Bangalore upon a sort of spur of gneiss, the valleys on the sides of which are limited in area, is by no means favorable. There are no springs,

Proceedings of the Madras Government, Military Department.

at least none which can be depended upon, and the supply of water for the Troops and inhabitants is derived from the tanks which have been constructed in the valleys, which retain the water of the monsoons, but which must also receive a good deal of the drainage of the Town.

A plan was suggested some two or three years ago, by which the water of one of these tanks was to be raised by a Steam Engine, and then distributed through Iron pipes to the different Military Establishments. This plan was adopted, and steps have been taken to carry it into effect. The building has been commenced for the Engine, a certain amount of pipes have been received, the Steam Engine is in the hands of the Government, and the Pumps are in course of construction, I believe.

I cannot, however, but think that the original plan, by which the water which fell on the roofs of the different buildings was to be carried into Tanks, and reserved for the use of the Troops, would have been the best. According to the pumping scheme, the water falls on the Barracks, descends some 70 or 80 feet, and is then, after being mixed with the general drainage of the town, pumped up at no small cost to be distributed to the Troops. It is true that the Sanitary Commission have reported that the analysis of the Ulsoor tank water is satisfactory; but in a dry season it is difficult to say what sort of change might take place in the water, and there can be no question that the pure rain water from the roofs of the buildings, allowed to settle in covered tanks, would be more likely to be uncontaminated with filth of any kind, than that which, after washing the general surface of the country, is retained in an open tank and there mixed with a portion, more or less large, of the drainage of the town.

I am therefore disposed to recommend the adoption of the original plan, and that provisions should be made for the retention of the whole of the water which falls upon the roofs of the different buildings, both in the new and old Barracks. From returns which I have procured, I find that the average rain-fall is 33.26 inches; during the months of December, January, February and March, the fall is very trifling, but during the other eight months the minimum fall is 1.46 inches, and the maximum 6.46 inches per month. Now, the surface or catch of one of the blocks of Barracks, which will contain (say) 90 men, is 24,225 square feet, and if the rain-fall be taken at only 2 feet, this will give in the course of the year a supply of 48,450 cubic feet, or $9\frac{1}{2}$ gallons per man per day for 90 men, which is an ample allowance.

By carrying the drainage of the roofs of all the buildings, including stables into a series of tanks, an ample supply will be secured for the drinking of the men and horses, at all events.

I do not propose to give up the scheme of pumping from the Ulsoor tank, but I should make this altogether subsidiary to the plan mentioned above. In dry seasons it might be necessary to supplement the drainage from the roofs, and the Engine could then be brought into action. The rain-fall on the roofs, too, could hardly be expected to supply the water for plunge-baths, and a variety of other purposes for which any decently clean water would answer. But as these objects would not be sufficient to put the Engine steadily at work for a certain number of hours per day, it might be as well to ascertain whether the Government of Mysore would not be disposed to avail itself of the spare power to pump up water for the supply of a part of the town. Such an idea has been mooted, and it would be as well that we should ascertain whether this might not be made to form a portion of the scheme.

Proceedings of the Madras Government, Military Department.

There is one more subject to which I wish to draw the attention of the Government. The Commander-in-Chief, in alluding to the comments made by the Sanitary Commission on the Prison on the race course, has suggested the construction of a Military Prison at Bangalore. It appears to me that a good Military Prison here might be made to answer for the whole of the Presidency, that is for all South of Secunderabad. That Station has, I believe, a good Military Prison. That at Bangalore, in a comparatively cool and healthy climate, might be made to accommodate the prisoners sent up from Madras and down from Bellary. There is now Railway communication from Madras, and in the course of a few years there will be similar means of communication with Bellary. I should therefore recommend that a Central Military Prison should form a part of the general scheme for the Military Buildings at Bangalore.

(Signed) W. DENISON.

Instructions for Captain Tulloch, Executive Engineer.

Captain Tulloch will put himself in communication with the Military Authorities, and will submit, as soon as possible, a rough sketch and a detailed description of the buildings and other works which will be required to complete the whole of the Military Establishments at Bangalore.

These will be as follows :—

1st.—Those which will be required to accommodate a Regiment of Cavalry and two Field Batteries of Artillery on the old race course. Captain Tulloch will note in his description and sketch those buildings which are completed or in progress, distinguishing them from the others which have still to be built.

It is believed that the eight blocks, of which six are complete and two approaching completion, will, when supplemented by the building now occupied as Serjeants' Mess-room and Recreation-room, be sufficient to accommodate the 18th Hussars at their present strength, and the two Field Batteries of Artillery. If this be the case, it will be necessary to provide a fresh set of buildings for the Mess of the Serjeants of Cavalry and another for Artillery, while separate sets of Recreation, will have to be built for both Corps upon a simple and more appropriate plan than that upon which the present building is constructed—should the accommodation be insufficient, another block may be added to the East range where there is ample space for it. In this case the 18th Hussars will occupy the five blocks of the East Range, and this will determine the position of the Stables for the Artillery and Cavalry. A question has been submitted to the Government, with reference to the construction of a Military Prison at Bangalore—this will be dealt with hereafter—but the existing Prison may be made with few alterations to serve as a Regimental Prison for the whole of the Troops quartered in these Barracks.

The Present Cavalry Barracks will be occupied by the 10th Regiment, as soon as the Hussars are moved to the race course, but there is not accommodation for more than eight Companies. Captain Tulloch will, therefore, in communication with the Military Authorities sketch out and describe all the buildings which it will be necessary to erect to accommodate an Infantry Regiment of the present strength, in addition to those already existing. Additions will have to be made to the Hospital attached to the present Cavalry Barracks, in order to enable it to accommodate the sick of a Regiment of Infantry—but as the building has been reported on unfavorably, it would be as well to build a new Hospital altogether, instead of attempting to add to one which in point of fact cannot well have additions made to it. A new Hospital for the men of the Regiment will therefore be included in the list of buildings required.

When these buildings are completed, adequate provision will be made for the accommodation of the European Cavalry, Artillery and Infantry.

2nd.—As it is very desirable that the Arsenal and Magazines, which now occupy a part of the Fort, should be removed and placed on a convenient site in the immediate vicinity of the Barracks, Captain Tulloch will put himself in communication with Colonel Barrow and the Ordnance Authorities, and ascertain from them the extent of accommodation suitable for their purposes, which will be afforded by the Barracks and other buildings now occupied by the Field Batteries of

Proceedings of the Madras Government, Military Department.

the Artillery—and he will submit a rough sketch and a description of the buildings which it may be necessary to erect in addition, including in these two Magazines, each capable of containing about one half of the quantity of powder required for the use of the Division.

The space occupied by the Arsenal will have to be enclosed with a good wall, and provision should be made for flanking this by Towers or something analogous at the angles; this will be considered when the distribution of the buildings is under consideration.

3rd.—*Water supply.*—Captain Tulloch will state fully what additional pipes, &c., he will require for the completion of the Ulsoor project—but at the same time he will sketch out and describe the tanks which it may be necessary to construct for the purpose of storing away the drainage from the roofs of the Barracks, estimating the rain-fall at an average of 30 inches per annum, and making allowance for a steady consumption of water from these tanks, at the rate of 10 Gallons per man per day.

4th.—*Commissariat.*—Captain Tulloch will put himself in communication with the Officer in charge of the Commissariat Department, and will ascertain from him the amount of accommodation which will be required for Commissariat Stores, and he will, in concert with that Officer, decide as to the extent to which the Barracks and other buildings now occupied by the 10th Regiment will meet the demands of the Department, noting of course the alterations required in these, and giving a description of the new buildings which will be wanted.

Captain Tulloch will understand that the sketches required are simple block Plans for the purpose of pointing out the sites of the proposed buildings, the descriptions being full enough to enable the Government to form an opinion of the extent of accommodation required.

(Signed) W. DENISON.

BANGALORE, 28th June 1865.

No. 212.

ORDER, No. 2554, 11th July 1865.

Resolved that the foregoing Minute by his Excellency the President, with Memorandum of Instructions to the Executive Engineer at Bangalore, be communicated to His Excellency the Commander-in-Chief and to the Department of Public Works.

2. On the submission of the information called for in the above papers, Government will be prepared to pass orders in detail on the several arrangements proposed. Meanwhile, the Commander-in-Chief is requested to favor Government with his remarks thereon, as early as convenient.

(Signed) R. HAMILTON, Lieut.-Colonel,

Under Secretary to Government.

THE
JOURNAL
OF
THE
AMERICAN
MEDICAL
ASSOCIATION
PUBLISHED WEEKLY
CHICAGO, ILL., U.S.A.
1914

